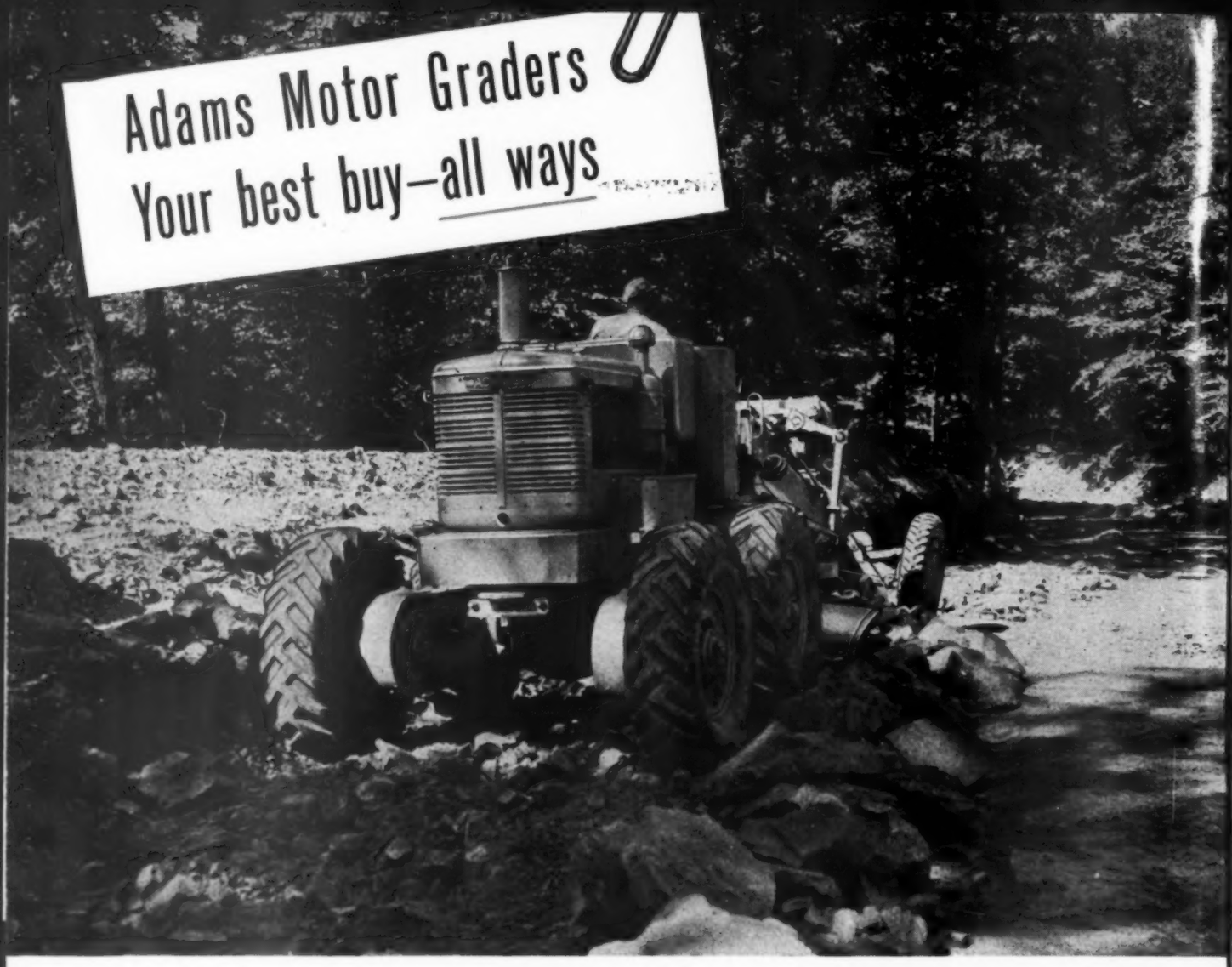
ROADS AND STREETS

APRIL 1947



Built Stronger to Last Longer

★ You don't have to worry about those rough, tough, grading jobs—not when you have an Adams Motor Grader on the job.

Adams Motor Graders are built with a big, extra measure of strength and stamina, through and through. They've got everything it takes for handling punishing jobs—for punching shale out of hillsides—making heavy ditch and bank cuts—scarifying hard surface material—bucking through deep snow drifts, etc.

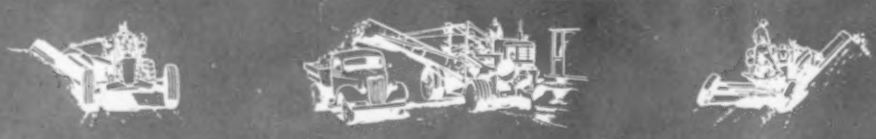
Yet, for all their great strength and stamina, Adams Motor Graders are not bulky or overweight. Theirs is the hard, lean strength of a trained athlete—free of all excess weight. That's why Adams Graders are so economical to operate and maintain—why they can be depended on to deliver efficient, reliable service, year after long year.

See your local Adams dealer. Let him show you why Adams Motor Graders are *Your Best Buy—All Ways.*

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

Adams

Motor Graders
Elevating Graders
Leaning Wheel Graders



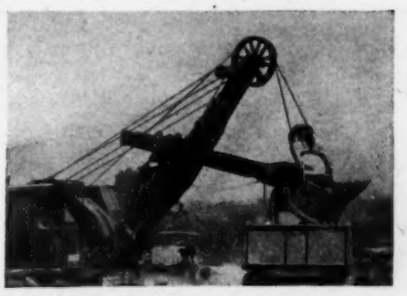
ALL THE KINDS OF STEEL YOU NEED FOR A HIGHWAY JOB

Whenever you need dependable steel for road- or bridge-building, get in touch with Bethlehem. Bethlehem's line of steel products for highways is complete. It contains practically everything you require, from drill steel to guard rail, to complete any highway contract.

You'll find it convenient to order all your requirements from Bethlehem, too, for Bethlehem makes it a point to work closely with contractors. Each order is handled as a unit, with individual items scheduled for delivery when needed.

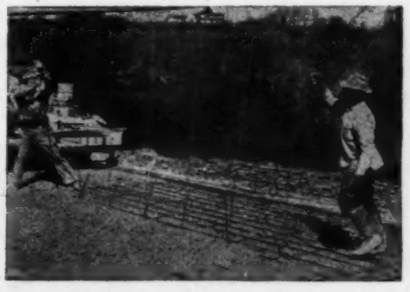
Shown here are some of the Bethlehem road steel items which you will find giving a good account of themselves in scores of road-building projects during coming months. Complete information is available on request.

DRILL STEEL—Need a tough drill steel for making shot holes? Use Bethlehem Hollow Drill Steel. It stands severe usage, is equally suitable for forged-on bits or detachable bits. Bethlehem also supplies Solid Drill Steel for such items as pinch bars, moil points and chisels.



WIRE ROPE—You can count on A-1 wire-rope performance when you team up with Bethlehem's Purple Strand for shovels, dragline excavators, scraper wagons and cranes. It has exceptionally high resistance to wear and fatigue. For best results use Purple Strand in the Form-Set (preformed) construction.

WELDED FABRIC—Bethlehem Electric Welded Fabric is excellent for use in reinforcing concrete roads and pavements. Of square or rectangular mesh, it is made from cold-drawn steel. Comes in rolls or sheets, and in various combinations of wire-spacings.



HINGED BAR MATS—An effective means of reinforcing road slabs. Bethlehem Hinged Bar Mat is handled by two men. Folds to about half the standard mat size, making it easy to truck without exceeding road-width limits. Meets state specifications.

GUARD RAIL—Bethlehem Safety-Beam Guard Rail affords maximum protection to motorists. Its sections lock together to form a continuous beam, impact being absorbed not by one, but by several adjacent posts. This efficient guard rail comes in lengths up to 50 ft.

LEADING BETHLEHEM HIGHWAY PRODUCTS

ROAD JOINTS — REINFORCING BARS — BAR MATS
GUARD RAIL — GUARD RAIL POSTS — WIRE ROPE
HOLLOW DRILL STEEL — FABRICATED STRUCTURAL STEEL
SHEET AND H-PILING — SPIKES — BOLTS AND NUTS
TIMBER BRIDGE HARDWARE — TIE-RODS

Bethlehem Steel Company, Bethlehem, Pa.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

STEEL for HIGHWAYS

★ BETHLEHEM STEEL ★

ROADS AND STREETS

APRIL, 1947 • VOL. 90 • No. 4

With Roads and Streets Have Been Combined Good Roads Magazine And Engineering & Contracting

In This Issue

Coming Articles

How One State Double Checks Contractors' Bid Prices

Estimating methods based on painstaking, independent analysis of each project, as developed by experienced field personnel of Arkansas highway department

Service Rigs

Repair and grease trucks seen on various construction jobs

Concrete Resurface for Busy Eastern Arterial

Design and construction methods employed on US 40, Maryland—one of largest projects of kind in East last year

Improved Signs for New Jersey Highways

Including design theory and structural details of neon-lighted overhead-bridge-mounted signs for "World's Busiest Arterial"

Steam Cleaning and How it Cut Repair Costs

With facts and figures on actual cases, reported from a southern highway maintenance shop

Sand-Shell Hot Mix Topping

How it was employed semi-experimentally on a Texas road job, using same materials for binder and surface course as are usually employed on flexible bases

How Track of 200-ft. Bascule Span was Repaired...Sand Emulsion Runways for Light-traffic Runway...Rippers and How to Use Them Effectively...Continuous Hot-Mix Plant as First Used in Ohio..."Contractors at Work" series continued...Job and Equipment Ideas...Equipment Maintenance Kinks...Notes on City Street work for '47...Other timely features.

A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

Gillette Publishing Company
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22 West Maple Street, Chicago 10, Ill.

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Get tomorrow's jobs done *today* on rubber tires!

TRAVEL time doesn't put dollars in the till. Long hauls between short jobs eat up time and profits.

And that's where a TL-20 Moto-Shovel, Clam, Drag or Hoe saves you money. Its rubber-tire mounting cuts travel time whether you move a 100 feet, yards or miles. On the job, the TL-20, incorporating the features listed, is the newest, smoothest unit in the ½ yd. class. Between jobs, it's the fastest stepping unit in any class.

Want the facts? Your local Thew-Lorain distributor has them. And remember—the contractor who digs and travels on rubber tires, today, will have the lowest costs and longest profits tomorrow.

THE THEW SHOVEL COMPANY, Lorain, Ohio

5 IDENTICAL CLUTCHES

ANTI-FRICTION BEARINGS

UNIT ASSEMBLY

INTERCHANGEABLE PARTS

OIL-ENCLOSED CUT GEARS

2 SPEED CRAWLER

INDEPENDENT ROPE SHOVEL CROWD

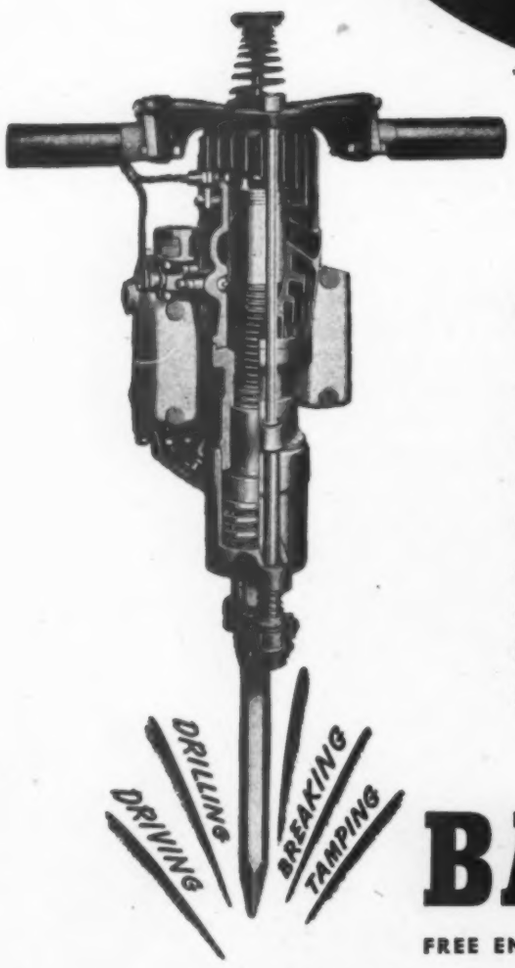
9 RUBBER-TIRE MOUNTINGS AVAILABLE

LIGHTS, STARTER, GENERATOR STANDARD EQUIPMENT

5 INTERCHANGEABLE BOOMS

Reg. Trade Mark

Lorain Thew **TL 20** Lorain



ON A THOUSAND AND ONE JOBS!

The all-around usefulness of Barco is lifting this Portable Hammer's popularity to new heights. Breaking, drilling, driving, tamping—there's almost no limit to the range of jobs Barco can do. Barco is easy to handle, easy to maintain and mighty difficult to do without. Send for complete details. Barco Manufacturing Co., Not Inc. 1815 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

BARCO PORTABLE GASOLINE HAMMERS

FREE ENTERPRISE — THE CORNERSTONE OF AMERICAN PROSPERITY

When we say the MultiFoote DuoMix 34-E is maneuverable, please don't—as our artist did—get the idea that thirty tons of dual-drum paver will handle like a jeep.

What we want to put across is that the MultiFoote DuoMix has remarkable ability to get in and out of tight places, like pouring street intersections or building foundations . . . getting over rough ground, narrow shoulders and soft spots. Its ground-bearing pressure is actually less on the long, wide crawlers than most *single-drum* 34-E's!

Also, the operator can *see* where he's going from the high DuoMix platform . . . and that makes every paving operation easier, faster and less strain on valuable operating personnel.

Add: Fast-charging, self-cleaning skip; full-automatic mixing cycle; high-speed bucket travel; Foote Double Cone drums and No-Pressure water system; *and* typical MultiFoote dependability on years of jobs ahead.

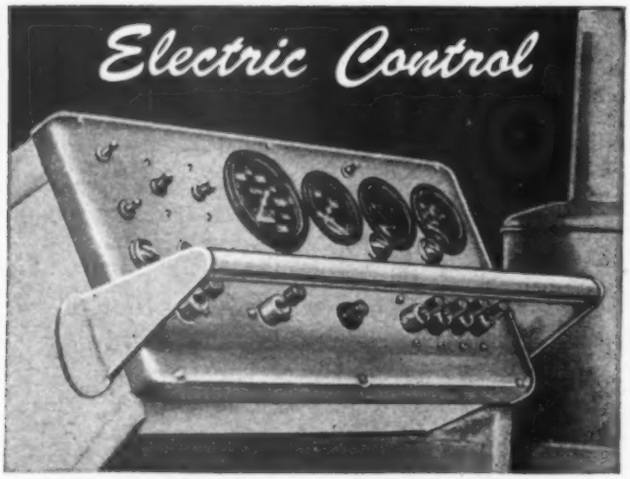
Total: A big dual-drum concrete paver that is a bit large for job-to-town commuting . . . but one we believe you will find is the biggest money-maker in a long line of high-job-profit MultiFoote Pavers.

Your MultiFoote Dealer has full information on the MultiFoote DuoMix 34-E . . . or write us direct for the new DuoMix Catalog.

THE FOOTE CO., INC.
1936 State Street, Nunda, New York

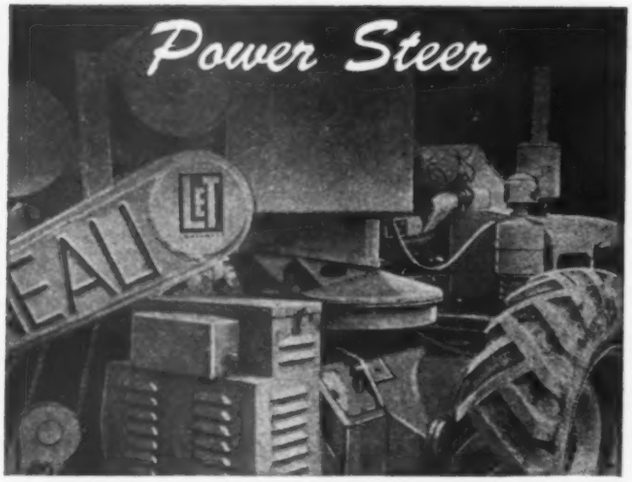
See Page 40

ONE-MAN ... New small



Bowl, apron, tailgate and steering controlled by Tournatorque electric motors. Each operation finger-tip controlled from dashboard. The Tournatorque electric motor is a new type of AC motor with the lugging characteristics of DC motors. Tournatorque electric motors and generators are simpler in operation and maintenance than the electric starter on your car or truck.

This new Tournapull hauls through loose sand, mud, snow or ice that would stall any previous wheeled vehicle. The revolutionary Tournamatic differential is so designed to make one wheel pull 4 times harder than the other before it will slip. Most power is automatically supplied to the wheel on firmest footing.



Electric motor operates a steering gear on the yoke king-pin. This locks Tournapull and Carryall into a single unit and keeps rig traveling in desired direction, regardless of underfoot conditions. Operator merely pushes a button to turn . . . Tournapull continues on same course until operator again pushes control button for right or left turn. Selective 2-speed steering gives positive control.

Electric control, power steer, positive traction make the new Tournapulls easy for the operator. Finger-tip controls for steering and all Scraper operation from a single control panel take the labor out of operating . . . reduce operator fatigue. Comfortable spring-cushioned seat, plus shock-absorbing rubber tires are a few more reasons why operators like the new Tournapulls.

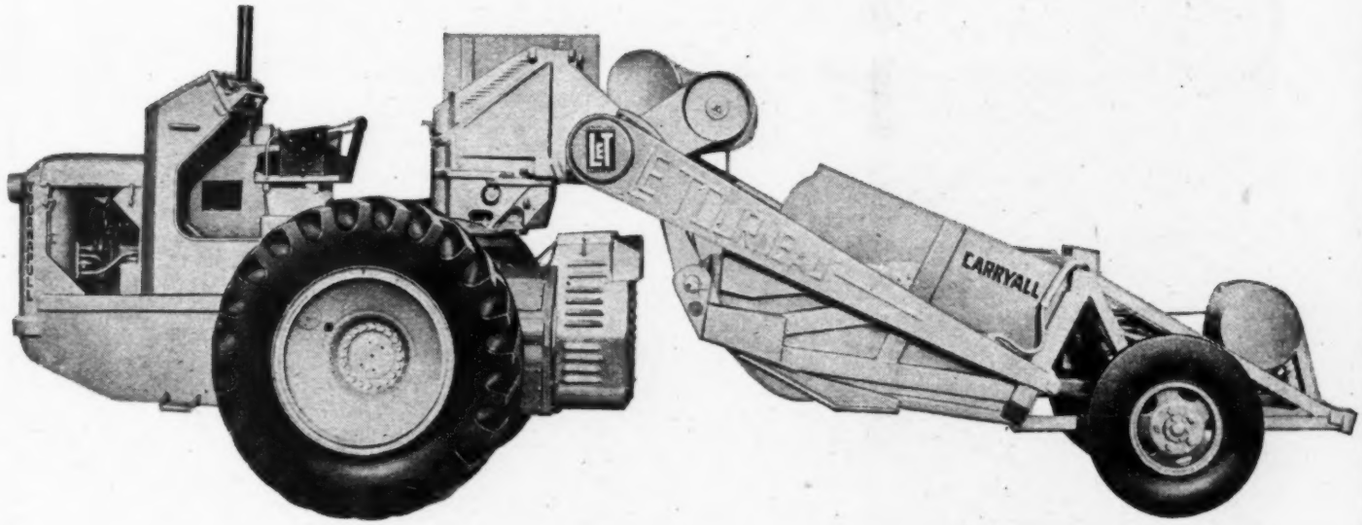
Tournapull Carryall — Trade Mark Reg. U. S. Pat. Off. C63 a

LeTOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

DIRTMOVER

TOURNAPULL



CLEARS slides; fills washouts; loads, hauls and spreads surfacing; strips and works gravel pits; digs stockponds; fills lots; levels building sites; grades and surfaces driveways or access roads; builds small dams or levees. Travels fast over pavements or cross country . . . no trailer or haul equipment needed. Continuous mesh Tournamatic transmission . . . no delay for shifting gears. Fills tank at any filling station.

SELF LOADING

3.3 YARDS PAY DIRT

85 H.P. GASOLINE ENGINE

TIRES { 14:00x32 PRIMEMOVER
9:00x16 ON CARRYALL

WEIGHS 7½ TONS EMPTY

Production per hour	
One-way haul	**Yards per hr.**
200′	48
400′	45
600′	42
800′	40
1000′	38
1500′	33
2000′	30
2500′	27
3000′	24
4000′	21
5000′	18

Above production figures based on average type scraper material, fairly level haul, good working conditions. Figures show production for 60-minute hour, one-man operation, no pusher.

LETOURNEAU PEORIA, ILLINOIS — JOB-PROVED Over 5000 Built and Shipped — **TOURNAPULLS**

LITTLEFORD PRESSURE DISTRIBUTORS *Really* CAN LAY IT DOWN!

See Him Go Says Little Joe

Simple in operation, but amazingly efficient on black top jobs. Available in two models: CLFA with engine mounted at front of tank; model CLRA has engine mounted at rear. Both are equipped with Littleford's famous Continuous Multi-Pass Heat Flue System, single valve control; air-cooled flue liner; three-speed transmission; tank level gauge; hydraulic ground clearance adjustment; suck back center folding spray bars, adjustable up to 24 feet; and many other features. Pumps, 375 gallons at 375 r.p.m.; tanks, 800 to 3000 gallons. Write today for the whole story on Spray Master Pressure Distributors.

"Spray Master" with Standard Tubular Bar

"Spray Master" with Vacuum Flow Circulating Spray Bar

LB BLACK TOP ROAD MAINTENANCE EQUIPMENT SINCE · 1900

LITTLEFORD

LITTLEFORD BROS., Inc.

454 E. PEARL ST., CINCINNATI 2, OHIO

THE NEW LIMA type 604

EVERYTHING THAT COULD BE ASKED FOR IN A 1½ CUBIC YARD SHOVEL OR 30 TON CRANE...

"PRECISION" AIR CONTROL
ANTI-FRICTION BEARINGS
INDEPENDENT CHAIN CROWD
ONE-PIECE WELDED FRAME
FOLDING GANTRY FRAME
WELDED STEEL SHOVEL BOOM
TUBULAR DIPPER HANDLE
ROLLER CHAIN POWER TAKE-OFF
CONVERTIBLE FRONT ENDS
INDEPENDENT BOOM HOIST
HOOK ROLLERS
CENTRAL LUBRICATION
MODERN STREAMLINED CAB

The LIMA Type 604 is a brand-new convertible shovel, crane and dragline that brings to the user everything that could be asked for in a 1½ cubic yard shovel or a crane of 30 tons capacity. Tested under actual job conditions—this great new LIMA has proved that it has the same superior quality, unrivalled ruggedness and great power that characterize all LIMA shovels, cranes and draglines. Its modern, up-to-the-minute design embodies numerous advantages and refinements that contribute to lower operating costs and peak performance throughout a long and profitable life. Yes, you will agree that the Type 604 was worth waiting for. Write today for a copy of bulletin 64.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division — LIMA, OHIO, U. S. A.

OFFICES IN PRINCIPAL CITIES

LIMA SHOVELS CRANES DRAGLINES

Capacities
Shovels ¾ Yd. to 5½ Yds.
Cranes 13 Tons to 100 Tons
Draglines Variable

LIMA

THE LIMA DIAMOND
FOR 75 YEARS AN EMBLEM OF QUALITY WORKMANSHIP

What appears to be a glass saxophone in the hands of a Sinclair Laboratory technician is in reality an important instrument used in protecting you against lubricants with low resistance to oxidation.

It's part of Sinclair's apparatus to determine oxidation rate of both non-additive and additive type lubricants. It is used constantly by Sinclair in Research and Refinery Control to assure you of maximum lubricant life without formation of harmful corrosive acids, varnish or carbon deposits on working surfaces.

Resistance to Oxidation is a prime requisite of all good lubricants. Sinclair's "Young Man With A Horn" — and others equally painstaking — stand guard constantly at Sinclair Laboratories to assure you that any Sinclair Lubricant you buy has the very highest degree of quality necessary for maximum operating efficiency.

Sinclair Automotive Lubricants

For Engines:
OPALINE MOTOR OIL
OPALINE TBT MOTOR OIL
(For severe service)
TENOL (Heavy Duty — For Diesels)
For Gears:
OPALINE GEAR LUBRICANTS
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FWDs GRADE ROADS FASTER AT LOWER COST

Equipped with underbody blade, an FWD four-wheel-drive truck is an outstanding road maintenance unit . . . fast, efficient, capable of patrolling great mileage at low cost. FWDs are engineered for this service, as well as for scores of other road construction and maintenance jobs. For more than 36 years they have proved that the true FWD four-wheel-drive principle, with center differential, gives them what it takes to be classed as the "ONE truck for MANY jobs" demanding the heaviest of heavy-duty performance in highway work, all year 'round.

See your nearest FWD Distributor, or write to . . .

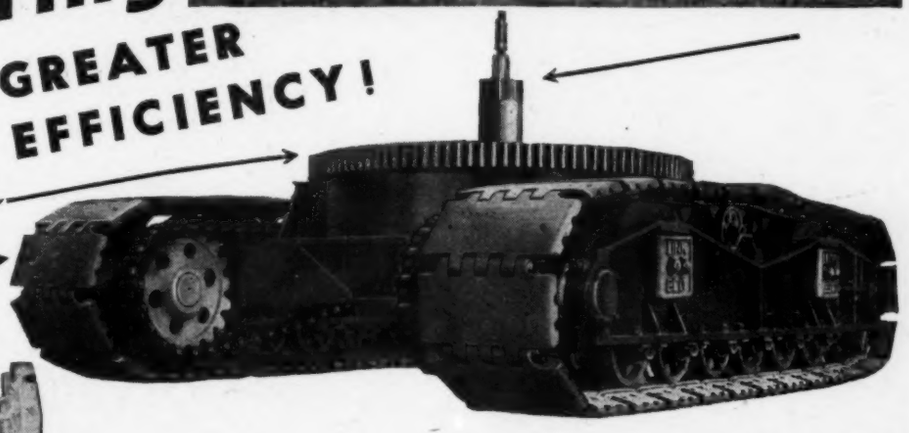
THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: KITCHENER, ONTARIO

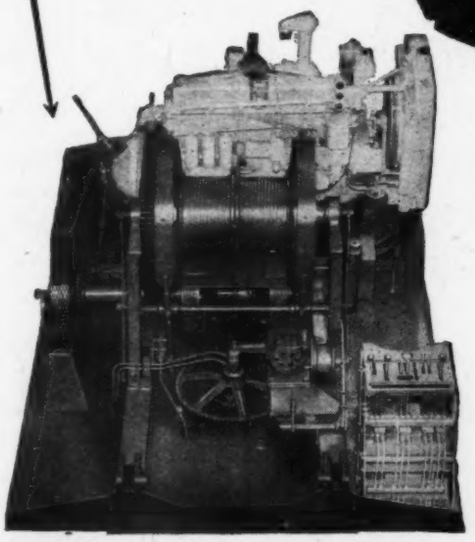
America's FWD *Foremost Heavy-Duty Truck*

LINK-BELT SPEEDER

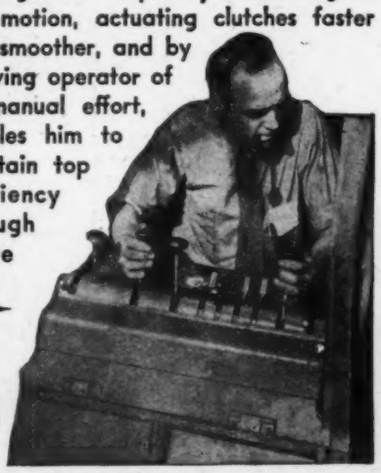
Advanced Engineering

GIVES YOU GREATER OPERATING EFFICIENCY!





Speed-O-Matic full hydraulic control gives greater output by eliminating all lost motion, actuating clutches faster and smoother, and by relieving operator of all manual effort, enables him to maintain top efficiency through entire shift. →



Size of dipper or horsepower of engine tell only part of the story of these Series 300, 1½ to 2 yd. Link-Belt Speeder Shovel-cranes. The real measure of their capacity for day-in, day-out yardage must be stated in terms of their speed, mobility, ease of operation and stamina that keeps them on the job. Some of these features are apparent from these pictures . . . mostly they must be seen in action to be fully appreciated. Have you asked your distributor for a demonstration?

All-steel, all-welded frame supports a clean-cut arrangement of machinery, from standard Diesel power plant to the control stand. Anti-friction bearings on drum shaft, swing and travel clutch shells and shafts. Safety type independent rapid boom-hoist, power controlled both up and down. Clutch friction blocks can be removed without disturbing drum or removing band. Propelling and steering mechanism fully enclosed in lower frame. Gears run in oil. Husky center pin and large conical rotating rollers.

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

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A DIVISION OF LINK-BELT COMPANY

Easy way to Build Good Roads at EXCEPTIONALLY Low Cost!

● Safe, long-lasting, all-weather roads can be built at considerable savings through the Barrett method of base stabilization. No unusual equipment is required, and the method makes maximum use of local materials. Tarvia* road tar may be mixed with the natural soil of the project, and thanks to the excellent waterproofing and binding properties of the paving material and to its uniformity of distribution, the resulting foundation will support loads without undue distortion at all seasons of the year.

For full details get in touch with the Barrett field man in your vicinity, or write for descriptive booklet.

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"THE LONGEST MILE," *a 30-minute, full-color, 16-mm. sound film on the development and importance of roads is now available for showing to highway officials, engineers and civic groups. Ask the Barrett field man for it, or write the nearest Barrett office.*

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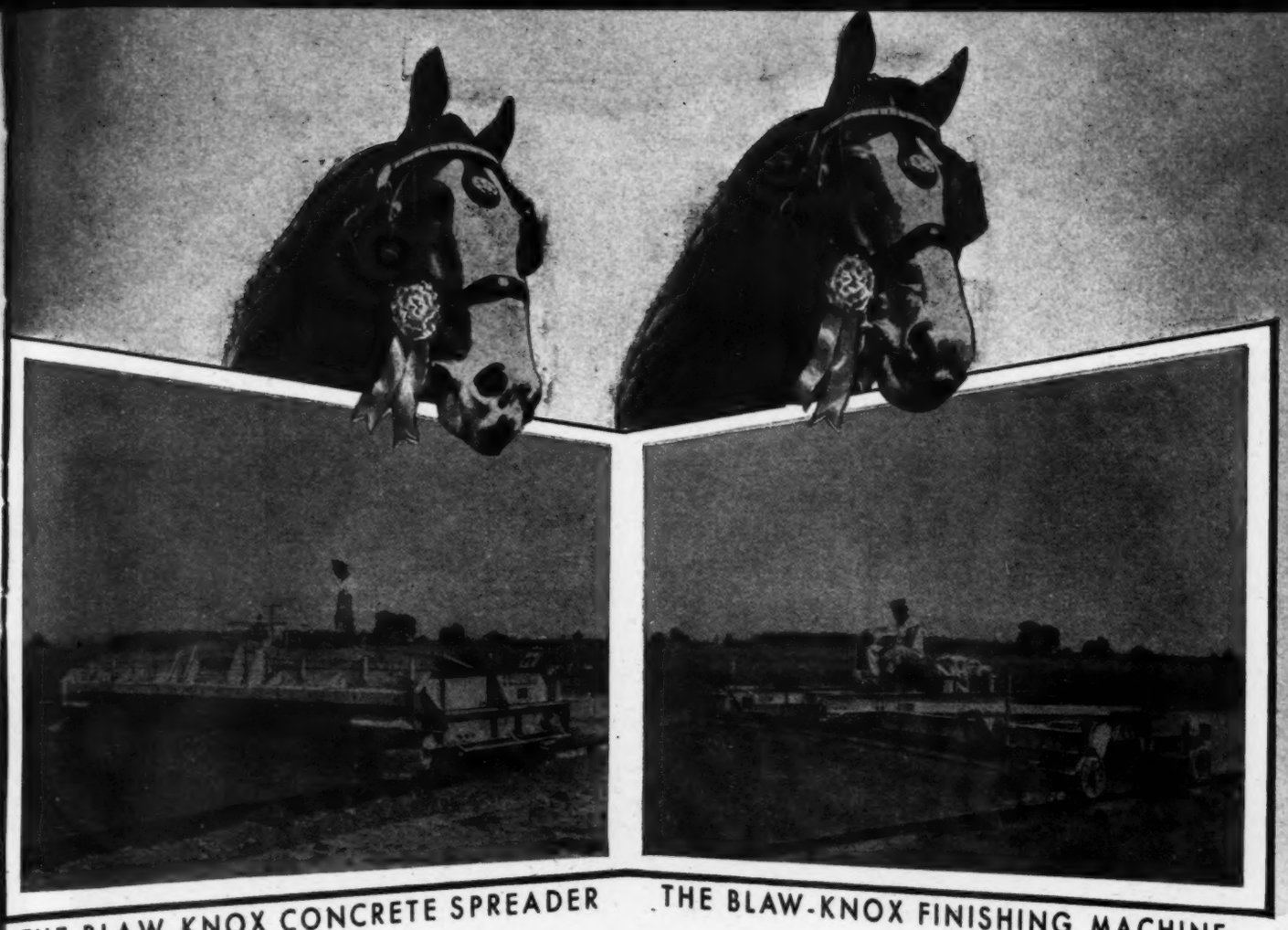

THE BLAW-KNOX CONCRETE SPREADER

THE BLAW-KNOX FINISHING MACHINE

The BLUE RIBBON Team!

The Blaw-Knox Transverse Blade CONCRETE SPREADER and the Blaw-Knox Concrete FINISHING MACHINE — a "blue ribbon" prize combination for finishing daily yardage that will chase your fastest pavers down the road as fast as they can put out concrete. If the concrete is dry and harsh, the vibratory paving attachment available for either machine insures peak production.

You'll get big yardage — with minimum crews. All Blaw-Knox Construction Equipment is designed to give just that kind of job performance.

See your nearest Blaw-Knox distributor for early deliveries — he will help you get that job started and keep it going on a steady and profitable basis.

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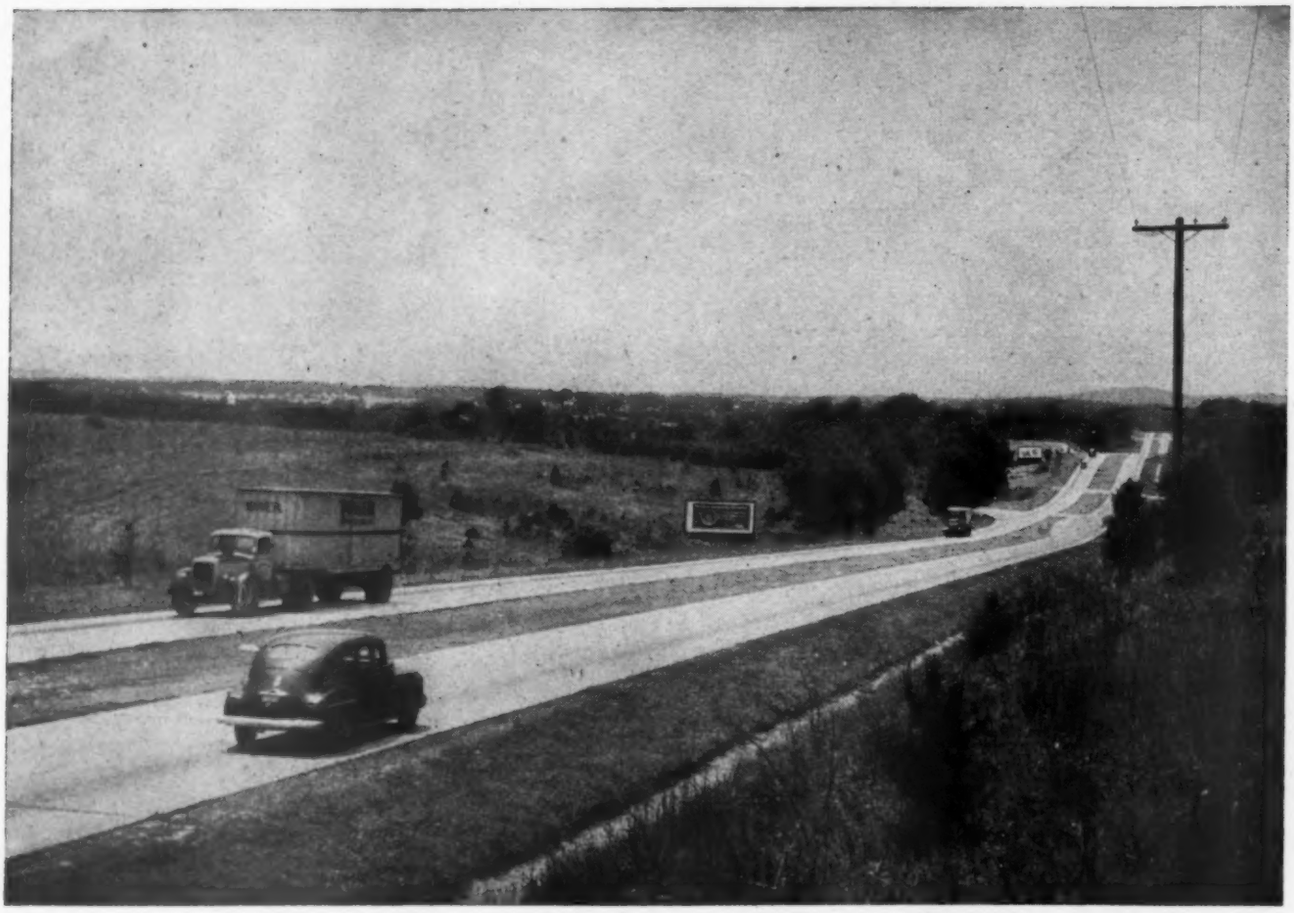
BLAW-KNOX CONSTRUCTION EQUIPMENT

CONCRETE BUCKETS · STEEL STREET FORMS · AGGREGATE BATCHING PLANTS · TRUCK MIXERS · PAVING FORMS FOR ROADS & AIRPORTS · CLAMSHELL BUCKETS · BULK CEMENT PLANTS



View on South Carolina's divided, four-lane concrete highway about midway between Greenville and Spartanburg. Road carries about 4,500 vehicles each day.

South's Longest Divided, Four-Lane Highway is *CONCRETE*

THE concrete-paved, four-lane, divided highway, which runs 27½ miles between Greenville and Spartanburg in South Carolina, is the South's longest divided-lane road. It provides a safe, fast and convenient route for the heavy bus, truck and passenger car traffic between these two industrial cities.

The project, completed in 1945, utilizes for one traffic lane, nearly ten miles of concrete pavement built 17 to 21 years ago.

Whether for rural highways, urban expressways or residential streets, concrete pavement gives long years of service at *low annual cost*—the true measure of pavement economy.

The long life of concrete has been demonstrated all over the country. Of more than 100,000 miles of concrete pavement built on state rural primary highway systems since 1910, approximately 80 per cent of it was still in service at the beginning of 1946.

Send for free copy of new book, "Concrete Pavement Design," for roads and streets carrying all classes of traffic. Distributed only in United States and Canada.

PORTLAND CEMENT ASSOCIATION

Dept. A4-28, 33 W. Grand Ave., Chicago 10, Illinois

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

4 REASONS WHY

Wendling Bros. Co., General Contractors, Dover, Ohio, are enthusiastic about their MICHIGAN Mobile SHOVEL-CRANE

SPEED AND ECONOMY: " . . . average daily fuel consumption is 20 gallons of gasoline . . . 600 yards of material loaded or unloaded per day and with clam we can excavate average of 400 yards per day. With trench hoe, 500 to 700 feet of of trench can be opened, depending on depth of ditch."

OPERATING EASE: " . . . Air Controls make this machine one of the easiest to operate."

TRUCK MOBILITY: " . . . Because of the ease with which MICHIGAN can be moved, we have worked on 5 different jobs in one day due to the fact that it can travel 30 to 35 miles per hour over the highway."

VERSATILITY: "We have used this machine for pile driving, dredging creeks, bridge building, setting steel, loading strip steel in 5 to 10 ton bundles and in one instance lifting a piano and putting it into an upstairs window."

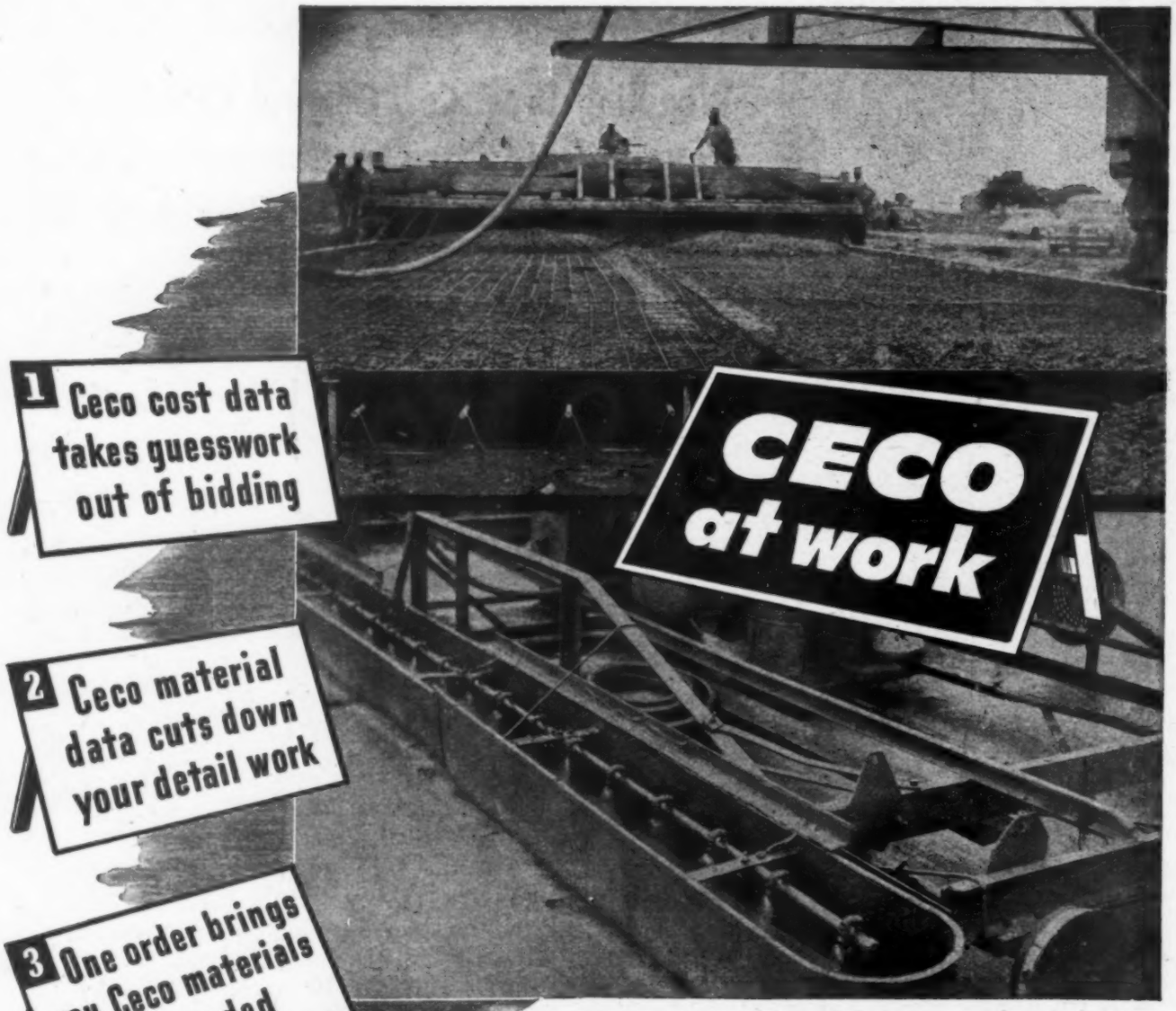
• • •

Wherever you go, you'll find long-time owners lavish in their praise of the ability of MICHIGAN Mobile SHOVELS-CRANES to do more work in less time, at less cost . . . Complete details on these ⅜ yd. and ½ yd. fully convertible MICHIGAN Mobile SHOVELS-CRANES is yours on request. Ask for Bulletin **RS-47**

MICHIGAN

POWER SHOVEL COMPANY

BENTON HARBOR, MICHIGAN



A 3 Point Program for Surer Road Building Profits

CECO offers you more than precision road building materials. It offers you a 3-point program for surer profits based on construction knowledge gained from years of practical experience. Call any one of 23 offices located coast to coast, for engineering skill and fine road building materials . . . plus a plan for road building profits. Remember Ceco's 3-point program takes the guesswork out of bidding, cuts down your detail work and one order brings you materials where you need them, when you need them.

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GENERAL OFFICES: 5701 West 26th Street, Chicago 50, Illinois

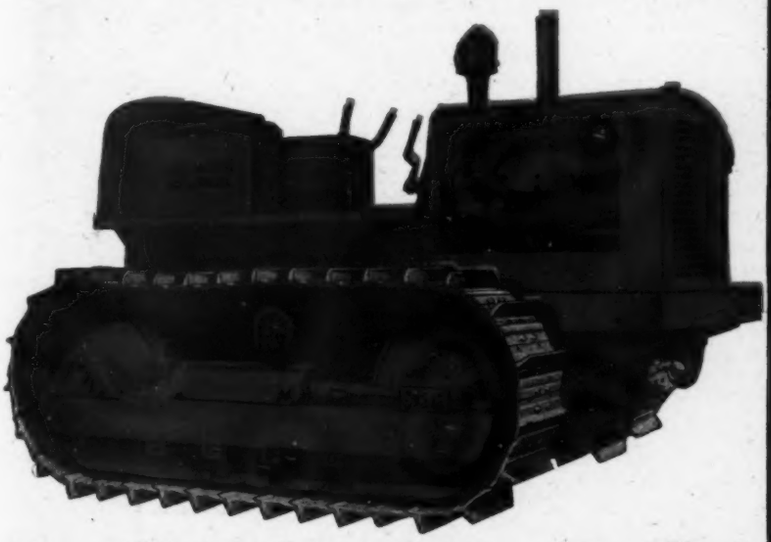
CECO STEEL

TYPICAL CECO HIGHWAY PRODUCTS • Welded Wire Fabric • Metal Center Strips
Cecure Curing Compound • Reinforcing Steel • Load Transfer Devices • Joint Sealing Compound
Dowel Bar Supports and Sockets • Stake Pins • Expansion Joints • Sub-Grade Paper

In construction products **CECO ENGINEERING** *makes the big difference*

Knowledge Experience Cooperation

BUILT A GREAT ALLIED LINE FOR A GREAT TRACTOR

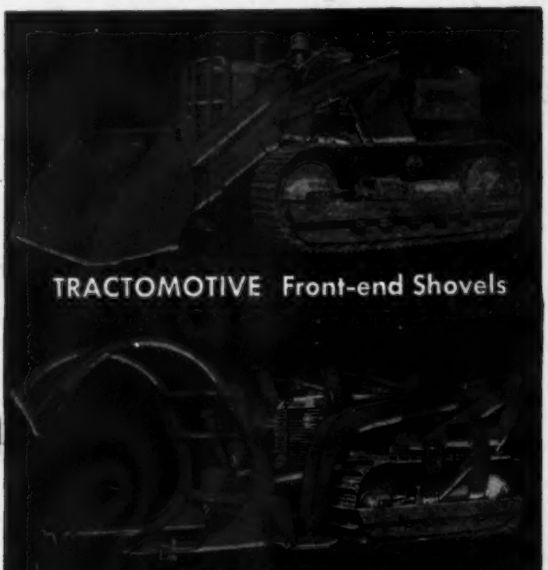


New Allis-Chalmers HD-5 and Its Allied Equipment Match Fully and Completely

- **Result of finest kind of cooperation between the various Allied manufacturers and the entire Allis-Chalmers organization, its dealers and users.**
- **Backed by the knowledge, experience, and facilities of each manufacturer . . . each skilled in his own field . . . each firmly established in his own right.**
- **Specialized design and engineering. Allied equipment was developed and tested along with the HD-5 . . . made to fit exactly and to perform with maximum efficiency.**
- **Both tractor and equipment sold and serviced by the same organization — exclusively by Allis-Chalmers dealers throughout the country.**

Yes, the HD-5 with any Allied unit is a fully matched power package . . . matched for greater output at lower cost.

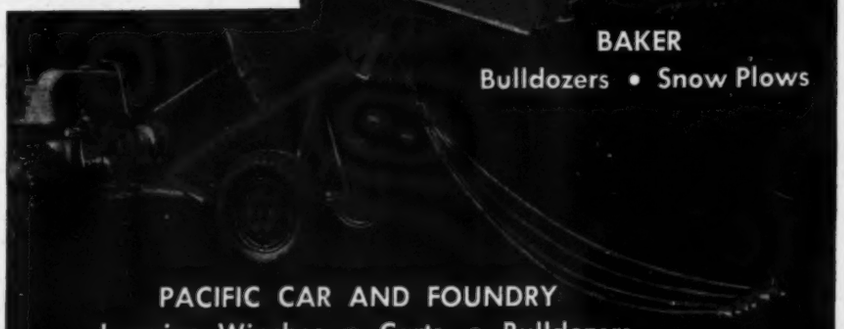
RUGGED! TOUGH! DEPENDABLE!



TRACTOMOTIVE Front-end Shovels

DROTT Skid-Loader

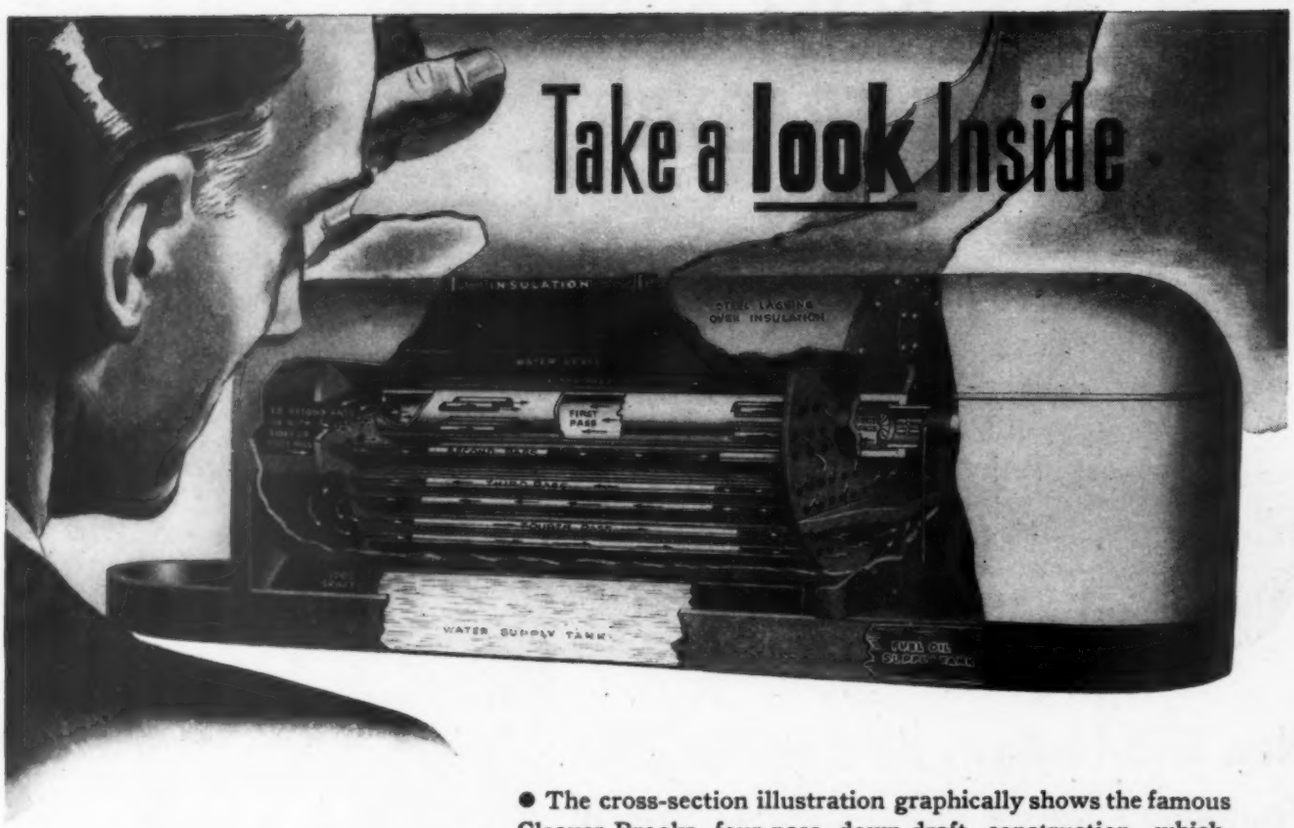
BAKER
Bulldozers • Snow Plows



PACIFIC CAR AND FOUNDRY
Logging Winches • Carts • Bulldozers

GAR WOOD Bulldozers • Scrapers • Winches

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



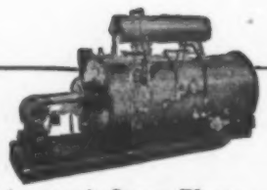
. . to see why you get hot, dry steam faster with less fuel and water

● The cross-section illustration graphically shows the famous Cleaver-Brooks four-pass down-draft construction which, with integral oil-burner, accounts for the remarkable efficiency of Cleaver-Brooks steam generating equipment.

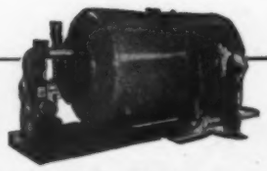
This construction doubles the lineal gas travel, compared to ordinary two-pass boilers,—the result is unmatched high heat transfer and efficiency.

No other equipment has this original and exclusive four-pass down-draft construction—plus the perfected positive dry coil method of condensate return—that's why you get hot, dry steam faster with less fuel and water with Cleaver-Brooks equipment. Write for bulletins and complete information.

CLEAVER-BROOKS COMPANY
5106 N. 33rd Street • Milwaukee 9, Wisconsin



Automatic Steam Plants
Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes from 20 to 500 h.p.; pressures 15 to 200 lbs.



Hot Water Boosters
Oil-fired; fully automatic or manual operation; no licensed engineer needed; two capacity sizes: 3000 gals. storage tank for 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank for 800 gals. of water heated 150° F. per hour.

Portable Pumping Boosters
Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Two sizes, truck mounting or 4-wheel trailer.

Portable Tank-Car Heaters
Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. Provides a portable source of steam wherever needed.

Cleaver-Brooks

Pioneers and Originators of ★TANK CAR HEATERS ★BITUMINOUS BOOSTERS ★AUTOMATIC STEAM-PLANTS

Haiss Snow Loader reduces removal costs 51%

in Ludington, Mich. (pop. 9,000)

Snows are heavy and frequent in Ludington.

Formerly, snow was removed by hand, but the City could not afford complete removal and the snow lay piled on important streets until spring. The City experimented with flushing the snow into the sewers with a fire hose, but this clogged the sewers.

In November 1945, Ludington solved its problem by buying a Haiss snow loader. For the first time, its streets could be quickly cleared for traffic—even in the heaviest snows.

James Cartier, Superintendent of Streets, takes pride in what the Haiss loader has done for Ludington and the money it has saved. "Last winter", he said, "we were all cleaned up with the loader and gone home, while nearby towns were still tied up in deep snow".

Below are Mr. Cartier's direct snow removal cost figures:

	Old Method 1944-45	Haiss Method 1945-46
Labor payroll	$4,200	$2,184
Gasoline and oil	3,077	1,634
All other expenses, repairs, etc.	1,423	459
	$8,700	$4,277

SAVING UNDER PREVIOUS YEAR: $4,423 (51 PER CENT).

Thus the direct saving for one year represents approximately 80 per cent of the loader's original cost, and Mr. Cartier's cost records show that the machine had paid for itself by March 1, 1947 (half-way through its second season).

The 18-man crew, (including six truck drivers) which formerly loaded snow by hand could handle only about 48 cubic yards per hour. The 9-man crew (including the same six truck drivers) now used with the Haiss snow loader has loaded as much as 600 cubic yards per hour.

Removing snow in Ludington with the Haiss machine is quick and efficient. The snow is first plowed into windrows in the center of the streets, usually overnight. Then the loader follows quickly, picks up the windrows, and keeps the trucks rolling to the snow dump. All streets are now kept passable throughout the winter.

On January 29, 1947, Ludington had a 12-inch snow storm, with three to seven-foot drifts. The Haiss snow loader was run for 16 consecutive hours. It immediately cleaned 14 downtown blocks representing about two miles of curb. In less than 24 hours, the downtown streets were clear. The rate of loading averaged 10 cubic yards per minute.

Write for full Information on the Haiss snow loader.

* * *

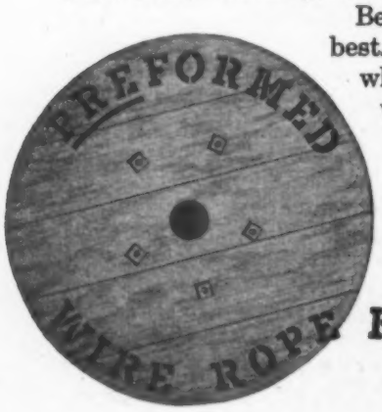
GEORGE HAISS MANUFACTURING CO.
381 CANAL PLACE — NEW YORK 51, N. Y.

This hot-ladle crane cost more than $100,000 . . . but as it is it couldn't work!

You don't use this sort of equipment in construction, but it affords a splendid example of where false economy might be extremely costly.

This gigantic, 100-ton, ladle crane cost well over $100,000—but it couldn't pour a drop of molten metal without wire rope. That's what's missing in this picture. How much does wire rope cost? Ordinary wire rope—about $1500. The superior wire rope—Preformed Improved Plow Steel—about $1800.

Be safe. Be sure. Don't let penny wisdom keep you from having the best. Specify Preformed of Improved Plow Steel for your next rope. And when you buy a machine—any machine—make certain it is equipped with Preformed. You will like it because it lasts longer. Your workmen will like it because it is easier and safer to handle.



WRITE FOR FREE COPY of helpful book about Preformed.
Address: Preformed Wire Rope Information Bureau,
520 North Michigan Avenue, Chicago 11.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

HANDLES EASIER - LASTS LONGER

NOW... A CONTRACTOR'S PUMP BY WORTHINGTON

Meet the Blue Brute Portable Self-Priming Centrifugal Pump, newest development of Worthington's 100-years-plus of experience in the design and manufacture of pumps. Fabricated of rust and abrasion-resisting alloy steel, it is ruggedly built to take the hardest knocks, yet light in weight for easy portability.

Fast, unfailing self-priming is a built-in feature of its advanced hydraulic design — not a troublesome auxiliary device. There is no priming valve to get out of order, none of the usual "recirculation" that reduces capacity or efficiency. The result is quick, dependable pick-up of water at all times.

Thoroughly tested in the modern research laboratories of the world's largest builder of pumps, this latest addition to the famous Blue Brute Construction Equipment line is a compact, streamlined portable pumping unit — in which simplicity of design and sturdiness of construction provide top performance under severest operating conditions . . . further proof that *there's more worth in Worthington-Ransome.*

For additional information on Blue Brute Portable Self-Priming Centrifugal Pumps, see your nearby Worthington Distributor. Or, write for Bulletin W-2010-B2.

H6-28

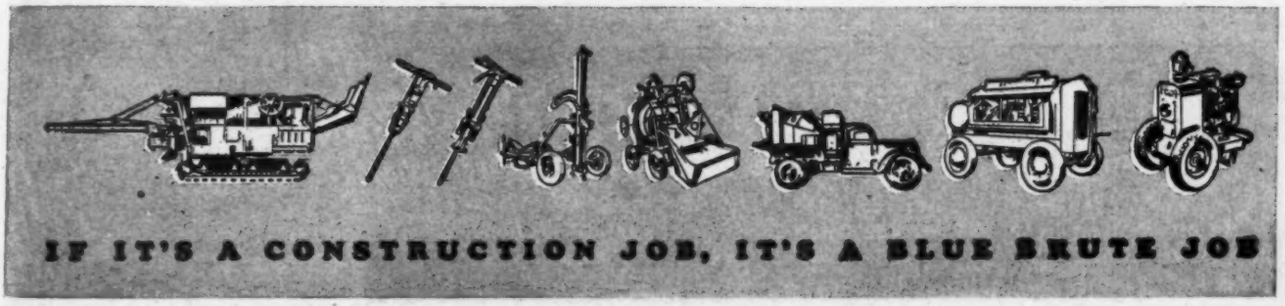
Blue Brute Pumps are built to the standards of the Associated General Contractors of America, Inc., and carry the A.G.C. rating plates.

Your Blue Brute Distributor will gladly show you how Worthington-Ransome construction equipment will put your planning on a profitable basis.

WORTHINGTON

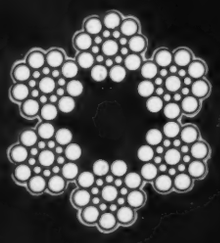
Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

BUY BLUE BRUTES



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

Best where wear is Hardest!



UPSON-WALTON
6 x 19 SEALE WIRE ROPE

FOR traction ropes on aerial tramways...for button conveyors and track cables . . . for car haulage systems, car pullers and spotters . . . for mine scrapers and slushers and slope haulages—many industries require a rope that is moderately flexible and still resists wear and abrasion to a very marked degree.

Upson-Walton Seale Layrite Perfection cable will outwear any other type of rope regularly used in this service. This is true because the rope is designed with coarser outer wires which can withstand abrasion longer.

Upson-Walton Seale is your best bet where the rope comes in contact with abrasive materials or is subjected to continual dragging on the ground, or where extreme friction and slippage are encountered.

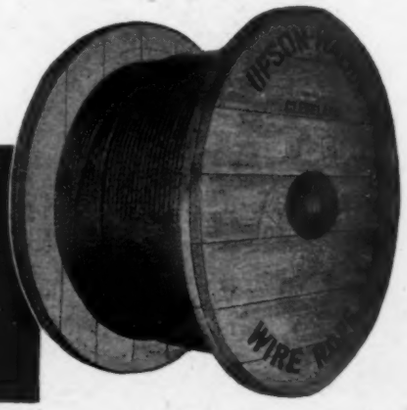
Hemp center or, where conditions are most severe, IWRC (independent wire rope center).

Perfection grade—because this improved plow steel is the strongest and toughest and most resistant to wear of all the grades of wire used to make rope.

Layrite—because this fine *pre*formed wire rope results in longer life, greater safety and greater economy.

Upson-Walton 6 x 37 Perfection Layrite is worth specifying, and always up to specifications!

Established 1871



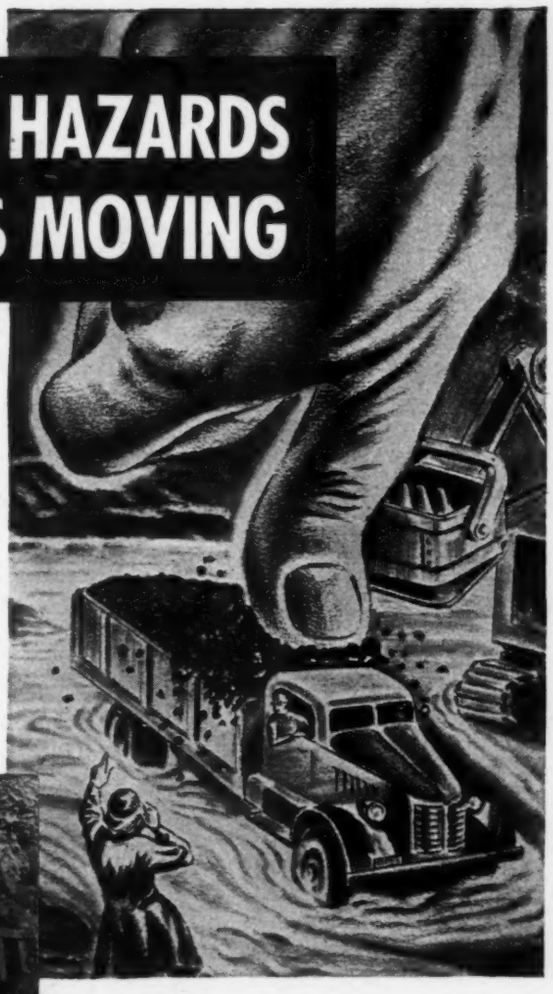
THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 | 737 W. Van Buren Street, Chicago 7 | 241 Oliver Building, Pittsburgh 22

How to BEAT WEATHER HAZARDS and KEEP SCHEDULES MOVING



WHEN you sign the contract and set your schedules, *you can't predict the weather!* A siege of bad weather and difficult running conditions that stop your trucks, can be mighty costly.

You are not at the mercy of the weather with Walter Tractor Trucks. As long as shovels can dig, these giant trucks will haul. When conventional two--and four-wheel drives are stopped by soggy ground, mud, slippery surfaces and grades . . . Walter Tractor Trucks keep loads moving.

Right:
WALTER 20-TON DUMPER

•

Below:
WALTER TRACTOR TRUCK hauling 40 ton trailer

There's a sound reason for this—the Walter 4-Point Positive Drive. In this drive, three automatic locking differentials act as a "mechanical brain," proportioning power to each of the FOUR driving wheels according to its traction at any instant. There is no wheel spinning to bog down trucks, because power is automatically concentrated on the *working* wheels at all times.

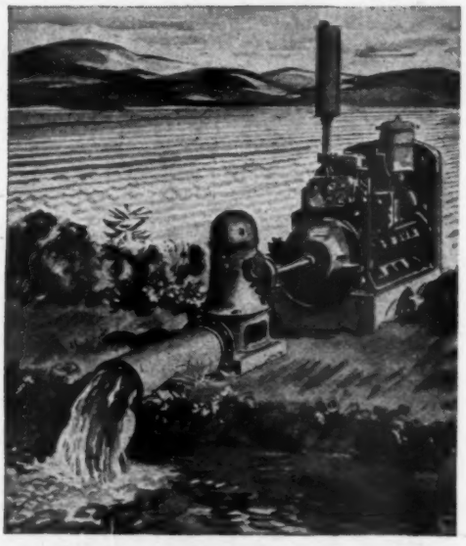
As you start your season, get full facts on the many engineering features and operating advantages of Walter Tractor Trucks for severe off-the-road hauling.

WALTER MOTOR TRUCK CO.
1001-19 IRVING AVENUE,
RIDGEWOOD 27, QUEENS, L. I., N. Y.

WALTER
TRACTOR TRUCKS

Bring on the hard work

Here's the Engine for it!



because—

there's power at every downstroke

No matter where a General Motors Diesel engine goes to work, you can count on a smooth, steady flow of power. Because each piston downstroke is a power stroke, there are twice the number of power impulses for each turn of the shaft. A "six" is as smooth as a "twelve" in an ordinary engine.

Besides there's better acceleration under a load—and starting's quicker.

So it's easy to see why GM Diesels are "naturals" wherever a steady, sturdy, smooth source of power is required—why they are top-notch for lumbering, fishing, construction, well drilling and for every job where tough, compact, dependable power is needed.

So, no matter what your requirements might be, if you want sturdy, money-making, safe power, be sure to look into General Motors Diesel engines.

DETROIT DIESEL ENGINE DIVISION

DETROIT 23, MICH. ● SINGLE ENGINES . . Up to 200 H.P. MULTIPLE UNITS . . Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

THAT'S RIGHT . . . for a truck that will save you money, get a *"Job-Rated"* truck.

A *"Job-Rated"* truck is a truck that FITS your job —a truck in which every unit is engineered and *"Job-Rated"* for the size and kind of loads you carry.

Such a truck is more dependable. It will last longer. It will save money on operating and upkeep costs.

Your *"Job-Rated"* truck will be the right one of 175 Dodge chassis models to give you maximum economy and dependability. It will have the right one of 7 different engines.

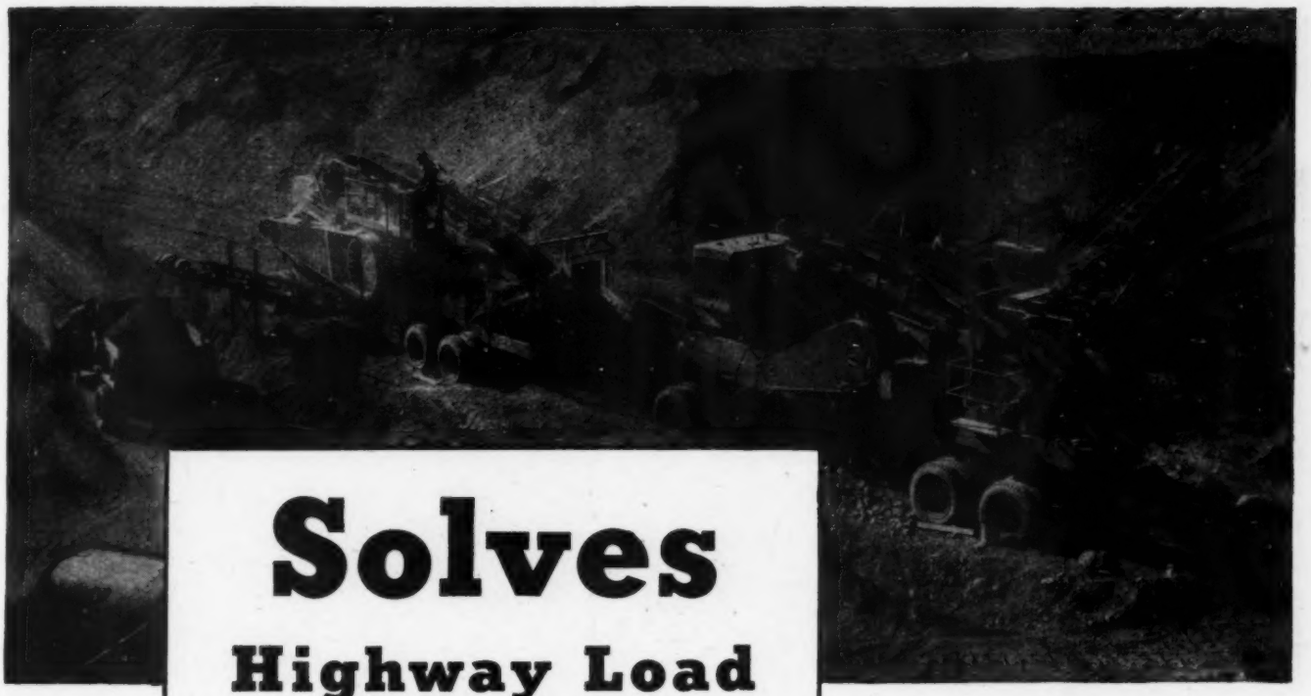
It will have the right one of 5 clutches, 4 transmissions, 18 rear axles—the right units throughout to fit YOUR job . . . save YOU money!

To get such a truck, see your Dodge dealer . . . because *only* Dodge builds *"Job-Rated"* trucks!

DODGE DIVISION OF CHRYSLER CORPORATION

ONLY DODGE BUILDS *"Job-Rated"* TRUCKS

Fit the Job . . . Last Longer !



Solves Highway Load Limits

NEW 2-UNIT
Crushing and Screening Plant

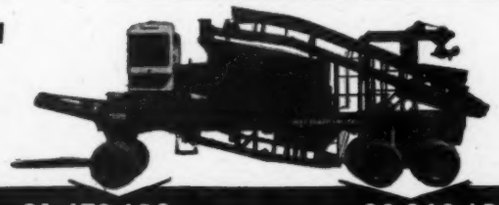
Your "moving day" problems will be minimized with this new 2-Unit Plant. It moves in and out of the pit easier and, with few exceptions, meets highway load limits as to weight, width and height.

In addition to being highly portable, it has the high capacity and features previously found only in duplex plants. Primary and Secondary Units are mounted on separate 3 axle trucks. Each has its own power unit so it can be operated singly.

Two Primary Units are available—one for quarry and one for gravel. You have your choice of 3 sizes of jaw crushers—10″ x 36″, 15″ x 36″ or 20″ x 36″.

The Secondary Unit is standard with feeder conveyor, roll crusher—40″ x 22″, vibrating screen—4′ x 10′, return conveyor and power unit. Write today for complete details about this new 2-Unit Plant.

1



21,470 LBS. 28,360 LBS.

2

15,020 LBS. 32,830 LBS.

PIONEER ENGINEERING WORKS
1515 CENTRAL AVENUE • MINNEAPOLIS 13, MINNESOTA

1. A PRIMARY UNIT built for gravel. Equipped with standard power unit and 10″ x 36″ jaw crusher. Height—12′6″, width—8′.

2. SECONDARY UNIT without power unit. Either gasoline or diesel units are furnished. Height—12′6″, width—8′.

Engineers and Manufacturers for Pit, Mine, Quarry, Bituminous, Materials Handling

PLAN WITH

Pioneer

ENGINEERING WORKS

Use the right DOW WEED KILLER!

2-4 Dow Weed Killer

Low cost. Highly recommended for killing broad-leaved weeds in lawns, to beautify parks, streets, and company buildings. Available both as a liquid and a powder.

Esteron 44 — a powerful 2, 4-D Weed Killer

Especially useful against many types of woody plants, such as wild rose, poison ivy, mesquite and sprouts of many other woody species. Ideal for use on cut-over land and along right of way.

Dow Contact Weed Killer

"Chemical Mower" for weeds along canals, ditch banks, fences and roads. Kills most annuals completely. Destroys all weeds and grass above ground, leaves roots to prevent soil erosion.

BECAUSE WEED PROBLEMS VARY with the kind of weed, soil conditions and climate, The Dow Chemical Company—major producer of the powerful new weed killing chemicals—has developed various *types* of weed killers. Each is designed to do its particular job well. Each has been tested and proved in the field under competent supervision. And the results of these tests—together with many reports from satisfied users—are available for your inspection.

For specific information and the complete story of Dow Weed Killers—consult state experiment stations and qualified dealers—or write direct to Dow. Plan now to control weeds the modern, practical way—without expensive digging, mowing or burning! *Spray 'em to death* with the *right* Dow Weed Killer!

Cut maintenance costs with—

DOW WEED KILLERS

AGRICULTURAL CHEMICAL DIVISION

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis
Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Ontario

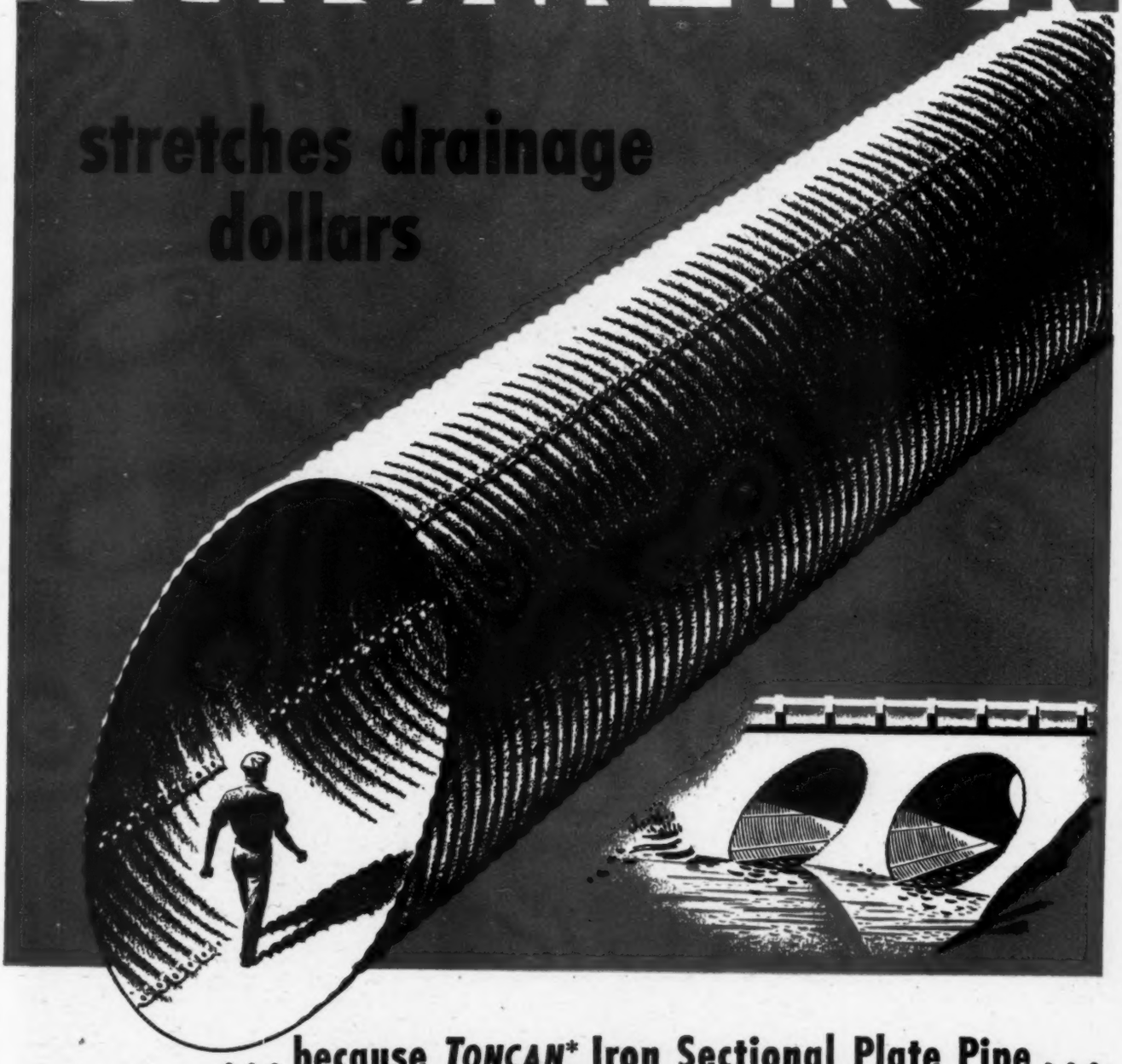
50th Anniversary 1897-1947

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

TONCAN IRON

stretches drainage dollars



. . . because *TONCAN** Iron Sectional Plate Pipe . . .

1. Is economical to handle and haul—and to install with unskilled labor.
2. Is shipped "knocked-down". All materials arrive in one complete lot.
3. Helps get jobs finished in a hurry, unhindered by season or weather.
4. Has the strength and resiliency to carry heavy loads and resist vibration.
5. Will not crack or crumble in hauling, handling or in service.
6. Contains twice the copper found in copper-bearing steels and irons—*plus* molybdenum.
7. Resists rust and corrosion caused by water, soil or sewage.
8. Insures lowest possible installation costs—lowest cost per year of service.

TONCAN CULVERT MANUFACTURERS' ASSOCIATION • CLEVELAND 14, OHIO

Toncan Iron — A Product of Republic Steel Corporation — is available in:

CORRUGATED METAL PIPE • PERFORATED CORRUGATED METAL PIPE • CORRUGATED METAL PIPE-ARCH • CORWEL SUBDRAINAGE PIPE
SECTIONAL PLATE PIPE • SECTIONAL PLATE ARCHES • SECTIONAL PLATE PIPE-ARCH • BITUMINOUS COATED AND PAVED PIPE

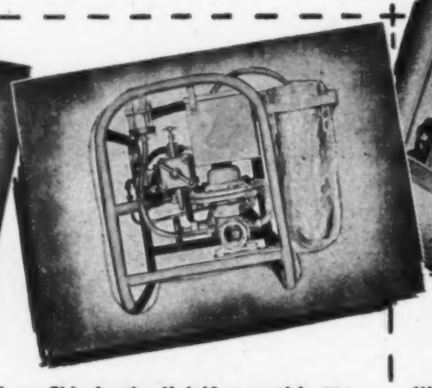
WATER PURIFICATION CHLORINATION DISTILLATION

PORTABLE UNITS AT GIVE-AWAY PRICES

These machines, built by well known manufacturers to strict Government standards, are available in neat, compact mobile and portable units, simple to install and easy to adjust. For complete description, specifications, types of equipment available, prices, and other pertinent data, write or phone the Chief, Sales Section 67, at the Regional Office holding the inventory.

Portable Water Purification Unit (Mobile) Converts impure water into clear, clean drinking water. The equipment can be cleaned easily with little loss of operating time. Consists mainly of a pumping unit and a filter unit. The water is cleaned by harmless chemicals. Forcing water reversely through the filter, washes the unit thoroughly. Available in "unused" and "used" condition at WAA Regional Offices indicated below.

Location: Atlanta, Birmingham, Charlotte, Dallas, Houston, Jacksonville, Kansas City, Little Rock, Los Angeles, Nashville, New Orleans, New York, Richmond, St. Louis, Salt Lake City, San Antonio, San Francisco, Seattle and Spokane.



Hypo-Chlorination Unit (Automatic)—This equipment efficiently chlorinates from 2 to 100 gallons of water per minute. The chlorine feed can be proportioned over a range of 10 to 1 for any one setting of the adjusting valve. Unit consists of hydraulic operated hypochlorinator, water meter, pressure regulating valve and manual range adjusting valve. Installation is simple—just connect the unit into the water line.

Location: Charlotte, Houston, Nashville, New Orleans, New York, Richmond, Salt Lake City, San Francisco and Spokane.

Water Distillation Unit—This equipment is adaptable to many uses by industry and small field organizations. Some units are trailer mounted fully equipped with tires, ready to move to the working locale; other units are portable, neat, compact and mounted on skid-type frames. Unit consists of a gasoline engine, steam compressor, and other parts and necessary piping all assembled and mounted on a structural steel base. Most of the units need no direct fired fuel burning equipment. A few units have oil burners.

Location: Trailer mounted type: Atlanta, Boston, Los Angeles, Nashville, New Orleans, New York, Richmond, Salt Lake City and San Francisco. Location: Skid-mounted type: Birmingham, Boston, New York, Richmond, Salt Lake City, San Antonio, San Francisco and St. Louis.

All purchases are subject to the War Assets Administration's standard conditions of sale, and all items are subject to prior sale.

Priority claimants have already had an opportunity to fulfill their requirements. Arrangement for inspection of these units may be made at any Regional Office where inventory is located.

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: ATLANTA • BIRMINGHAM • BOSTON • CHARLOTTE • CHICAGO
CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • FORT WORTH • HELENA • HOUSTON
JACKSONVILLE • KANSAS CITY, MO. • LITTLE ROCK • LOS ANGELES • LOUISVILLE • MINNEAPOLIS
NASHVILLE • NEW ORLEANS • NEW YORK • OMAHA • PHILADELPHIA • PORTLAND, ORE. • RICHMOND
SALT LAKE CITY • ST. LOUIS • SAN ANTONIO • SAN FRANCISCO • SEATTLE • SPOKANE • TULSA

1043

Uncover larger earthmoving *Profits*

. . . roll back the dirt quickly with Heil Hydraulic Bulldozers

The dirt really rolls back when you use a Heil Hydraulic Bulldozer. Yardages are bigger — costs lower. The secret of this unequalled rolling action lies in the design of the Heil Bulldozer blade. The scientific contour of this blade, developed after many years of earthmoving experience, provides a cleaner cutting action and a bigger load-carrying capacity without increasing size or weight. The cutting edges, made of special wear-resistant steel, are reversible. The additional life gained is just another of many Heil cost-cutting features. Here are a few more that save you time and money on any job:

The easy-handling, trouble-free Heil hydraulic unit provides quick finger-tip control. The positive action enables the operator to place the blade exactly where he wants it — he can dig faster and move more dirt. The all-welded, box-section construction, the sturdy connections, and the proper distribution of loads and stresses keep your tractors on the job longer — making bigger profits for you. Install a Heil Hydraulic Bulldozer on your Oliver-Cletrac as soon as possible. It's an easy, quick mounting job. See your Oliver-Cletrac distributor.

R-88

Heil Dump Bodies and Hoists are built to take the punishment of tough working schedules—there is less time out, less expense for repairs, and you haul more loads per day, when these long-life units are on the job. Your local Heil distributor has all the facts about why it pays to use Heil Twin-Arm Hoists and Bodies.

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

"Caterpillar" equipment

LARGER TIRES GIVE LOWER YARDAGE COSTS

They provide—GREATER TRACTION—BETTER FLOTATION—EASIER PULL—LONGER TIRE LIFE

is NEVER UNDER-TIRED

NEVER shall it be said that "Caterpillar" equipment has "too little" of what it takes to do a job right and at lowest cost. It is the "Caterpillar" rule always to provide *more* than the severest operating conditions might demand.

Extra strength, extra-quality materials, extra protection against wear, are plainly evident in every "Caterpillar" part and mechanism. Take tires:

"Caterpillar" Diesel Wheel-type Tractors and Scrapers are tired for maximum production, greatest load flotation and longest tire life.

"Caterpillar" tire specifications have been worked out from the most intensive study of loads, traction, hauling speeds and surface conditions ever undertaken by a tractor manufacturer. They are *engineered* for the job.

Increased wheel diameters with greater tire cross-sections permit low inflation pressures under maximum loads. These features create larger "foot-print"—or bearing areas—reduce power-consuming penetration—give better traction—increase operating speeds over soft earth. Adding tire size also adds (tremendously!) to tire life on the speedier hauls over hard surfaces.

Thus, through practical engineering and job-aid recommendations, "Caterpillar" aims to make your tires as profitable an investment as the rest of your rugged, efficient and dependable "Caterpillar" Diesel Wheel-type Tractor or Scraper.

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Asphalt Resurfacing

. . . makes a jallopy ride like a cloud

MOTORISTS get real benefits when streets and highways are resurfaced with asphalt.

First, they do not have to detour while the road is being resurfaced. As the picture above shows, two lanes at the left are open for traffic while the resurfacing asphalt is applied on the other two lanes.

Secondly, they get the smooth, quiet, easy-riding surface asphalt provides.

You will like asphalt resurfacing because it can be used to replace practically any worn or broken highway surface at a fraction of the cost of rebuilding.

A Standard Oil Asphalt Representative can give you many reasons why asphalt resurfacing provides streets and highways which the riding public will praise. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the representative nearest you.

STANDARD OIL
ASPHALT

STANDARD OIL COMPANY (INDIANA)

STANDARD SERVICE

This One Will Make Your Trucks Earn More Money for You

It's the Thornton 4-rear-wheel Drive. It converts medium trucks into heavy-duty haulers in every way but cost!

Trucks with a normal G.V.W. of 15,000 to 16,000 lbs. are converted into big, powerful six-wheelers with a G.V.W. rating of 26,000 to 32,000 lbs. as a truck . . . 42,000 to 44,000 lbs. as a tractor.

More than that, the Thornton 4-rear-wheel Drive is built to stand up under all kinds of road construction and road maintenance operations. That means your trucks can haul heavier loads of road materials and equipment *right to the job!*

The Thornton 4-rear-wheel Drive provides *two* driving axles instead of one. You get a two-speed gear case assembly equipped with the famous NoSPIN Differential that gives full driving power to all rear wheels. The NoSPIN Differential is automatic-locking! When installed in each of the two driving axles, it prevents wheel-spin. That is because rear wheels *must* rotate when power is applied.

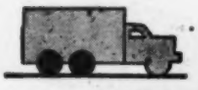
You also get "walking-beam" type springs, additional wheels and tires, necessary frame reinforcements, and attaching parts.

So isn't it a foregone conclusion that this time-proved conversion unit can make your trucks earn more money for you?

Call your truck dealer or local Truckstell distributor for complete information on this BIG idea. Or write The Truckstell Company, Union Commerce Bldg., Cleveland 14, Ohio.

THORNTON 4-REAR-WHEEL DRIVE

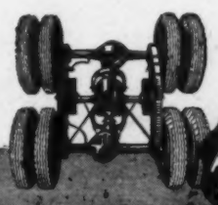
Converts a Medium-duty Truck



. . . into a Big, Powerful Six-Wheeler

RESULT: 100% More Payload
100% More Tractive Effort

THE NoSPIN DIFFERENTIAL used in the Thornton 4-rear-wheel Drive will also increase the efficiency of your *4-wheel* trucks. Fits virtually any driving axle. Prevents wheel-spin . . . keeps your truck from stalling in mud, muck, sand and snow . . . on ice or on slippery roads.



Approved AND DISTRIBUTED BY

THORNTON 4 REAR WHEEL DRIVE

TRUCKSTELL
SPECIALIZED EQUIPMENT FOR PLUS PERFORMANCE

Manufactured by DETROIT AUTOMOTIVE PRODUCTS CORP. (Formerly Thornton Tandem Company) Detroit, Michigan

Kinetic

..the NEW MIXING PRINCIPLE that makes SMALL ASPHALT JOBS Profitable!

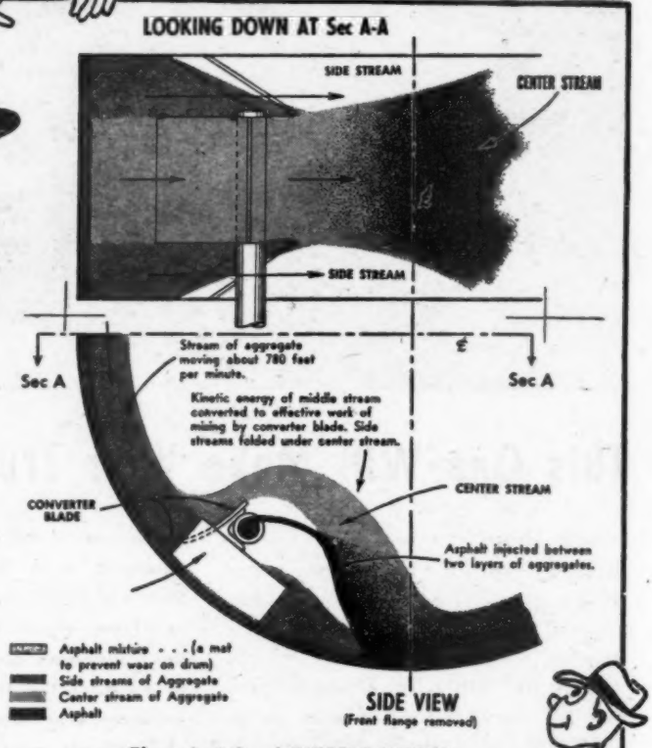
HERE'S how the new Foote Kinetic Mixer works — here's why this small, fully portable machine can handle any cold mix asphalt and produce 3 cubic feet of thoroughly mixed material in only 30 seconds!

Centrifugal force of revolving drum holds material against inside drum face. Linear travel stores up kinetic energy to do the work of mixing. Energy converter blade (see diagram) peels a stream of material off drum face, slowing speed of material, and creating powerful mixing action. Cross-mixing blades cause side-to-side mixing action. Asphalt is sprayed into material beyond converter blade in metered amounts—up to 8 gallons in 6 seconds. Every particle of aggregate gets complete, uniform asphalt coating—fast!

Ask your Foote Dealer for details on this new way to make any small asphalt job a real money-maker—or write direct for Bulletin K-100

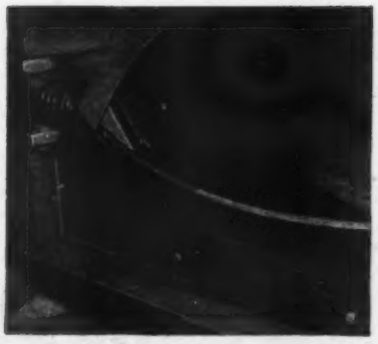
THE FOOTE COMPANY, INC.
1935 State Street, Nunda, N. Y.

See Page 5

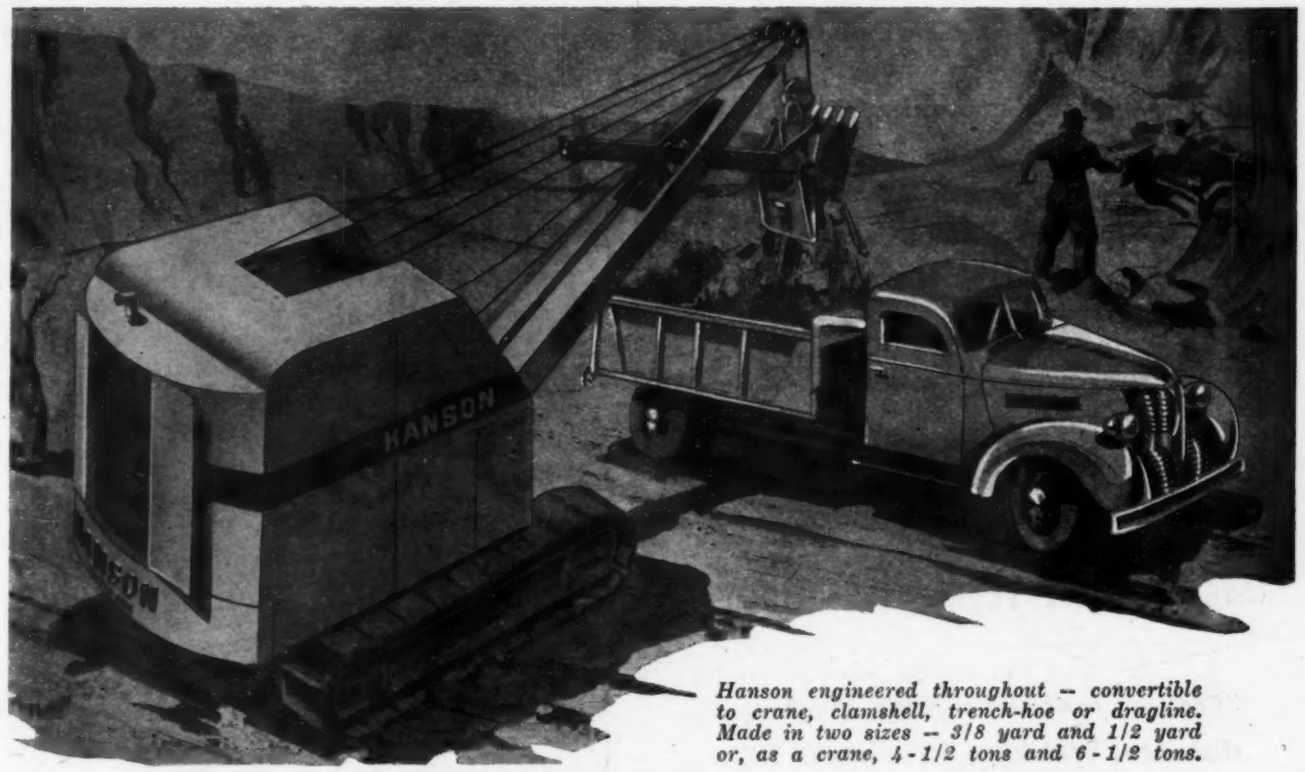


The principle of KINETIC MIXING

a thoroughly mixed batch every 30 seconds



5 seconds **charging** + 20 seconds **mixing** + 5 seconds **discharging**



Hanson engineered throughout -- convertible to crane, clamshell, trench-hoe or dragline. Made in two sizes -- 3/8 yard and 1/2 yard or, as a crane, 4-1/2 tons and 6-1/2 tons.

It's POSITIVE POWER in a HANSON

It's there when you need it -- and in full measure! Reports drift back -- "I'd like to have another just like it" -- "You can sure turn out the work with a Hanson!"

HERE IS WHY: Full revolving . . . chain crowd . . . fully enclosed steel cab . . . air-controlled steering . . . all-welded, steel construction . . . disc type clutches on swing . . . internal expansion, booster-type clutches on hoist and crowd . . . all clutches easily adjusted or relined without removing shaft assemblies . . . extra long crawlers and low center of gravity . . . speedy -- versatile -- rugged!

Write for detailed specifications to Dept. RS-47.

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HAVE YOU MADE YOUR RESERVATION?

"Catalog is always within reaching distance. Wouldn't be without it!"

A State Highway Engineer made this comment, but practically the same thing has been said by County, City and Federal Engineers; Road and Street Contractors, and Airport Engineers and Managers.

Comments come pouring in from every part of the field in praise of the Catalog and asking to be kept on the list to receive the next edition.

Requests come from the men who plan and design, construct and maintain the roads and streets of the Nation. They are the State, Federal, City and County Engineers; Chairmen of County Boards; Directors of Public Works; Engineers of National Parks and Forests; and Airport Managers and Engineers. They are the Highway and Heavy Construction Contractors who furnish the major market for the purchase of road building equipment and materials.

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It is estimated that expenditures for maintenance alone this year will reach the billion dollar mark. To this will be added another billion for new construction and improvements. Step up your advertising for increased buying tempo in this huge market for road building and maintenance equipment and supplies.

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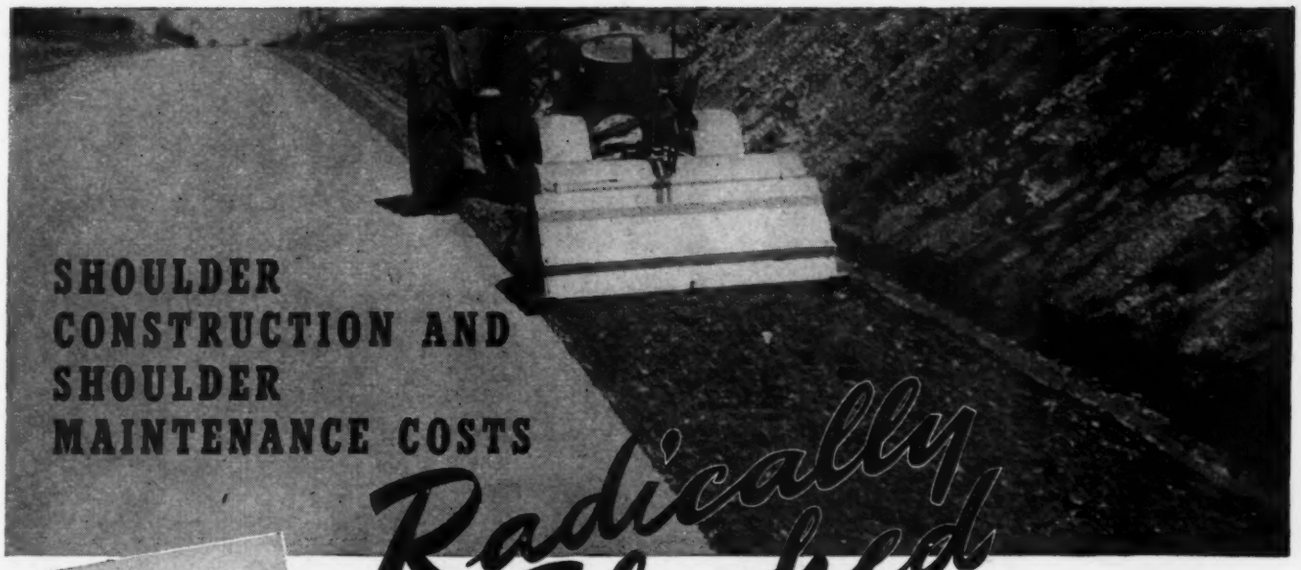


SHOULDER CONSTRUCTION AND SHOULDER MAINTENANCE COSTS

Radically Slashed with the SEAMAN MIXER

Shoulder stabilization is highly profitable in terms of lower maintenance costs and in greater traffic safety. With the SEAMAN MIXER, the initial stabilization costs can generally be cut as much as 40% in comparison to former methods, — for in most cases, — the aggregate already present in existing shoulders is entirely suitable for stabilization with oil, cement or other binders without trenching out or bringing in a single yard of borrowed material . . . For example,— in an eastern state, the Highway Department formerly kept 40 motor patrols busy on shoulder maintenance alone. Following every severe rain, scores of truckloads of gravel were required to replenish material which had washed away and what's more, drains and catch basins were plugged in the process . . . Shoulder stabilization with SEAMAN MIXERS proved to be the answer. The SEAMANS loosened the in-place aggregate to the required depth and in the same operation, started the mix . . . Total cost of scarifying, shaping and mixing was 5 cents per yard. So for similar low-cost shoulder stabilization,—do it with a SEAMAN.

Shoulder stabilization will prevent slab deterioration, traffic hazards and erosion such as occurred here.

SEAMAN MOTORS, INC.
MILWAUKEE 3, WISCONSIN

Requests keep right on coming in for this handy, practical book, "Soil Stabilization Methods" — compiled by Seaman engineers. Have you sent for your copy? Ask for Bulletin RS-25.

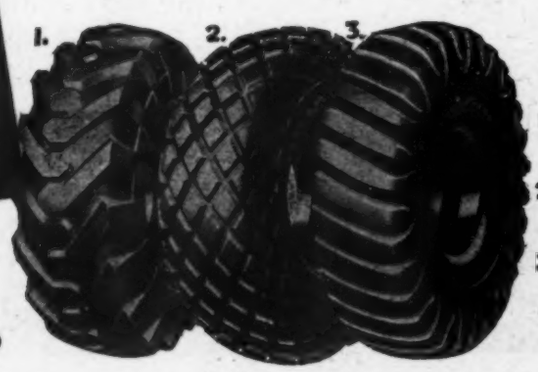
WHAT you see above is not only a grading job, but a *low-cost* grading job—because that operator is getting maximum traction, minimum slip, from his Goodyear Sure-Grip tires.

The reason is straight and simple. Sure-Grips give more grip and go because of Goodyear's *open center* tread design. It keeps each lug bar completely separate—gives each lug a bite edge right in the heart of the traction zone. So the *entire* lug can dig in full depth, full length, and *grip*. And with no connected lugs to form mud traps that pack up and cause excess slip, Goodyear *open center* tread is self-cleaning, deep-biting.

On the drive wheels of work units—from road graders to giant earth-movers—Sure-Grips have no equal. Year after year of low-cost, high-hour performance proves *that*. That's why they're *first choice* with veteran contractors everywhere—and why it will pay you to buy and specify Goodyears for your units.

GOODYEAR

BUY and SPECIFY GOODYEAR —it pays!



THE RIGHT TIRE FOR EVERY JOB

1. **SURE-GRIP** for maximum traction on drive wheels
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Sure-Grip, All-Weather—T.M.'s The Goodyear T. & R. Co.

MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND

ROADS AND STREETS

APRIL, 1947 • VOL. 90 • No. 4

With Brewster's Paving Outfit on

Wilkes-Barre—Scranton Airport

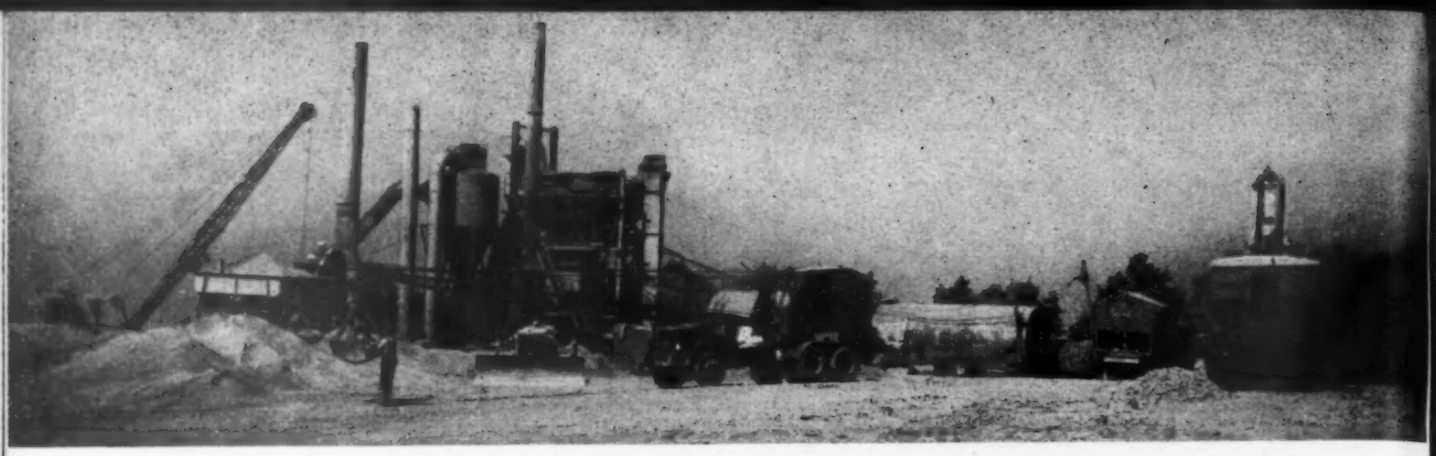
Ingenious plant set-up, liberal use of specialized equipment, and conciliatory labor policy paid big dividends on this job

THE Civil Aeronautics Administration recently completed the grading, draining, and paving of one of the most unusual airports in the United States. While this is not the only mountain-top airport, it is unique in that the mountain is honeycombed with abandoned coal mines. The mine workings were in various stages of subsidence when this site was first considered as the most desirable location for an airport to serve the two

★ Power broom was pulled by most any available vehicle—in this case an idle water truck

★ Geo. M. Brewster & Son, Inc., of Bogota, N. J., had grading contract, which included placing pavement subbase. A gang of water drills is shown putting exploratory holes to detect possible subsurface condition likely to cave in due to abandoned coal mines

★ Up-to-date crushing plant produced all aggregate for both base course and asphaltic-concrete surface. High daily output—1400 cu. yd. of highly abrasive stone per day—resulted from careful planning, and use of specialized hauling equipment for bringing stone to the crusher and stockpiling the finished product



★ Portable asphalt plant was set up within a few hundred feet of the crushing plant. Output averaged 700 tons per day

★ Small all-purpose tractor pulls rubber-tired roller and broom drag to spread and work in seal coat aggregate

Pennsylvania cities of Wilkes-Barre and Scranton.

The U. S. Engineers first tackled the problem of designing this airport as a national defense measure. Bids were received but subsequently rejected as the military need lessened. Revived as one of the first postwar airport projects, CAA supplemented USED design data with investigations of their own.

The George M. Brewster & Son Co., Inc., of Bogota, N. J., was awarded the contract for clearing, grading (4,000,000 c. y., 60% rock), draining and pavement subbase at $3,692,730.

C. J. Langenfelder & Son of Baltimore was awarded the paving contract 305,700 sq. yd. of flexible base and asphalt surface runways and taxiways, and 3,333 sq. yd. of 9-in. concrete apron for $712,286.

Hinkle & McCoy of Philadelphia was awarded the seeding contract at $33,661 covering 200 acres.

Joseph Cucci, Locust Valley, Long Island, N. Y., installed contact and obstruction lighting at a contract price of $17,516.

R & S Carried Grading Story

The May '46 issue of R & S carried the story of Brewster's grading contract. Big equipment, and lots of it, featured this company's near-record pace of 30,000 cu. yd. per 10-hr. day. Noteworthy also was their record for safety under adverse working conditions. They beat a 300-day time limit partly under the impetus of a $3500 per day overtime penalty.

★ Brewster used 4500 gal. capacity tank trailer to supply water in compacting earth fills where moisture was below optimum and to lay dust on haul roads

★ Coarse aggregate for macadam base was spread to proper depth and grade by use of mechanical stone spreader. Stone was quarried and crushed on airport site

★ Shop-constructed spreader bar was used to spread coarse aggregate directly from dump trucks in those areas inaccessible to the mechanical spreader. [See R&S July '46 for details of spreader bar construction]

★ Tractors and pans were very carefully used as the final operation in removing surplus subbase material. Specs. allowed only ¾ in. tolerance from true grade

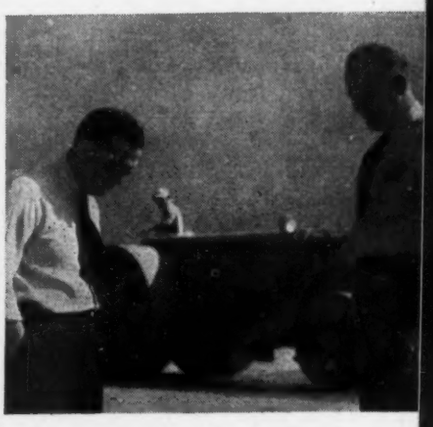
★ Bulldozer levels area near runway edge after airport lighting duct has been placed

Designed for 74,000 lb. gross loading, the existing E soil (CAA classification) required a standard section of 5-in. granular subbase, 9-in. dry-bound macadam and 2-in. dense graded asphaltic concrete surface. Brewster's contract included placing and shaping the subbase. Frequent tests by CAA's field laboratory personnel maintained close control over the subbase compaction, specified as 95% of maximum density using modified proctor method.

Twenty-five 15-yd. bottom-dump trucks were used to haul suitable material about 3 mi. from a point below Avoca, Pa. These fast-moving trucks used city streets and crossed one arterial highway without undue difficulty. A special haul road was cut along the mountainside to shorten the haul.

Working in complete cooperation with the sponsoring cities and CAA, Brewster located and designed this road so that it can easily be converted into the airport entrance road. This forethought will save much of otherwise necessary cost of road construction. Further along this same thought of planning temporary construction facilities so that they may have permanent value, Brewster's field office, maintenance shop building, and other structures now provide quite satisfactory temporary terminal area buildings.

★ J. P. McGinnis on left was Langenfelder's project manager. Mr. (pardon, sir, didn't get your name) behind the dark glasses was the superintendent



★ James Herendeen on left, resident engineer and Charles Dietz, his assistant, are shown inspecting an expansion joint in the airport's concrete parking apron. Both men came to CAA from N. Y. State Highway Dept., bringing with them a wealth of much-needed "know how." Both contractors were generous in their praise of the way these men handled this exceptionally large and complicated CAA project

Priority Areas

Recognizing the potential difficulties which could arise from having two big outfits working in the same area, CAA officials resorted to a priority plan to expedite the work. Under Brewster's contract, the northerly half of the airport was to be completed in 50 days ahead of completion of the entire project. Langenfelder's contract accordingly specified that this area would be available first and that the starting of paving of the balance of the airport was to be postponed until the expiration of Brewster's contract time. Despite some unavoidable delays, the merit of the plan was borne out by the lack of friction between the two contractors, both of whom were working against huge overtime penalties.

★ This picture, taken from near center of airport, shows completed pavement in foreground, equipment spreading base course in the center, and haul road to quarry and asphalt plant on hill in background. [See R&S May '46 for description of Langenfelder's downhill-haul]

★ 2 in. dense-graded asphaltic surface course was placed on 9 in. macadam base and 5 in. subbase. Tack-coated base is shown in foreground

★ Pressure distributors applied 0.2 gal. of RC-2 asphalt seal coat per sq. yd.

★ Truck operated mechanical spreader applying seal coat aggregate immediately behind pressure distributor

★ Same all-purpose tractor pulled power broom to remove excess seal coat aggregate as final paving operation

Mobile Paving Equipment

Langenfelder's set-up on this job could easily be compared to the organization, efficiency, and mobility usually associated with a large circus. Every piece of equipment was mobile and highly efficient for the job it was called on to perform.

Front-end dump trucks, designed primarily for use in producing aggregates, first fed the stone to a portable crusher, and then helped stock pile the crushed stone near the portable asphalt plant.

As shown in some of the accompanying photographs, specialized equipment played its labor-saving part throughout all paving operations. Mechanical spreaders placed the base course and spread the choking aggregate, power brooms and rollers keyed the stone, motor patrols straightened out any kinks in the grade, large-capacity pressure distributors applied the prime and seal coats, asphalt spreaders placed the hot top, and finally, rubber-tired rollers knitted in the seal coat aggregate.

Highly Unionized Labor

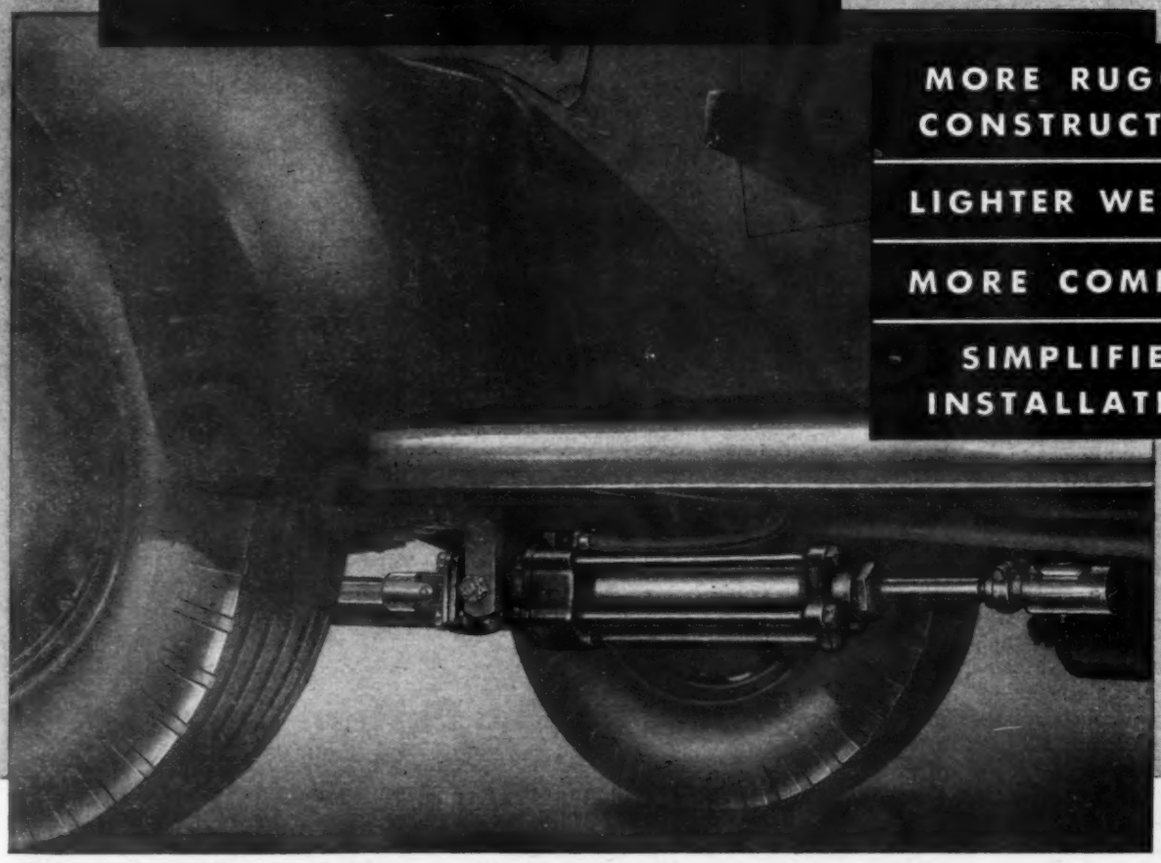
Commenting on the labor situation, J. P. McGinnis, Langenfelder's project manager, said he had found men fairly easy to hire and to be above average in efficiency and productive effort. Everything was unionized, however, and he had to fire only two men to find out that it simply cannot be done in those parts, no matter what. The strike which resulted in each case not only slowed the work down, but showed plainly the extent to which unionized labor has taken over what have heretofore been considered management's prerogatives. After everyone understood each other, things went along smoothly with the contractor more thankful than ever for his mechanized equipment. The drones had established their place in the scheme of things.

Relied on Shops

Langenfelder waged a winning battle against the shortage of equipment and repair parts by relying largely on a well-equipped repair shop. Many a crippling breakdown was prevented by an improvised part hammered out on an anvil or machined on a lathe. Local shops, established primarily to serve the mines, were a welcome supplement to the contractor's facilities.

As a result of the cooperative effort of the Federal Government, the officials of the cities of Wilkes-Barre, Scranton and Avoca, the Commissioners of Luzerne and Lackawanna Counties, and the various contractors' organizations, a Class IV, three-runway airport is now available for public and airline use. Fortunate to have gotten in on the Defense Landing Area Program, this highly important industrial area can now apply for financial assistance under the recently enacted Federal Airport Plan to enable it to plan and construct the less expensive, but highly essential permanent terminal facilities.

THE REDESIGNED VICKERS *Hydraulic* POWER STEERING BOOSTER



MORE RUGGED CONSTRUCTION

LIGHTER WEIGHT

MORE COMPACT

SIMPLIFIED INSTALLATION

Added to the advantages always inherent in Vickers Hydraulic Power Steering are now lower price, a substantial saving in weight, more rugged and compact construction and an integral (instead of a separate) relief valve that greatly simplifies installation. More than a year's testing on city buses and heavy trucks under the most severe operating conditions has proved the redesigned Vickers Hydraulic Power Steering Booster (original design has been in use for 16 years).

The steering effort required can easily be supplied by your little finger . . . steering load is carried by the hydraulic cylinder . . . road shocks are not transmitted to the steering wheel . . . automatic protection against abuse . . . see new Bulletin 47-30 for all the facts about Vickers Hydraulic Power Steering System.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

***Write for* NEW BULLETIN 47-30**

Illustrating and describing the Redesigned Vickers Hydraulic Power Steering System.

Representative Applications of VICKERS *Hydraulic* POWER STEERING

EDITORIAL

★ The Long View on Traffic Accidents

A prediction: If traffic accidents are not greatly reduced and soon, the gravity of the problem will finally penetrate the public mind, and something will happen that will fundamentally affect highway development. For example, we may see forty-mile-per-hour governors on our cars and trucks. Or driver license limitations that will rule millions off the highways. Or a general slowing down of enthusiasm for road programs that "turn our roads into speedways and deathtraps."

A warning that more restrictive laws are sure to come if safety efforts aren't intensified was uttered recently by Clifford J. Fletcher, New York state commissioner of motor vehicles. Speaking at a meeting of two large eastern highway user groups, he asserted that disregard of the law is the principal cause of vehicular mishaps, and that failure to observe regulations becomes a habit with some motorists.

At this same meeting William Gottlieb, president of the New York State Automobile Association, agreed that outmoded highways play their part in the traffic picture. Which puts us back on our home grounds.

We now know the final score on 1946 accidents, and the National Safety Council's figures set traffic deaths for the year at 33,000, injuries at a million or so, and economic loss from motor mishaps at over one and one-half billion dollars. This is far under the all-time-high of 39,000 deaths in 1941, although traffic flow last year was the highest in history. This heartening fact we can attribute in a large measure to the President's traffic safety conference last May and, to the generally stiffer and more coordinated enforcement and educational work done in countless communities as a result.

The finest modern expressways are death traps unless effective laws are on the books and the local judges and cops are on the job. And laws and cops can go only so far unless every boy and girl is trained to be a safe pedestrian and driver.

At present most highway departments leave such safety matters to others, sticking to their traditional knitting, which is road design and maintenance. But why should the responsibility be so divided? We venture that the economic loss from motor accidents runs into larger sums in most states than are available for highway construction and maintenance combined. What good is brilliant engineering, when enforcement is lax and education planless and neglected?

We're not thinking of the city problem here, so much as the rural one. Our highway leaders in Washington and many state capitals are truly big men in their thinking, and their thinking is being devoted increasingly to the living dynamic highways in relation to the social and economic needs of the community. This concept makes it almost mandatory that highway departments eventually maintain traffic safety as well as the physical pavement.

★ Decay of Big Eastern Cities

Eastern metropolitan centers—that is, some of them—are living up to the cynic's prediction: "Modern expressways? Fine things! But we'll never get 'em in our town, with our political and financial mess."

Look at Baltimore's experience. A legislative kick in the teeth last year set back expressway plans.

Now it's Philadelphia. Civic quibbling, local procrastination and petty sniping by people with greedy, selfish motives—to quote a recent newspaper editorial—have recently threatened to blockade the much needed widening of Vine street downtown. Such news, like the traction problem in Chicago and other perennial problems in other cities, is an old story in the city of brotherly love, which has grown old, old, old.

The farther west you go (yes, there are exceptions), the more cities you'll find getting somewhere in their expressway plans. And in so doing, they are setting the stage for continued growth, staving off decay. It's almost as simple as that in this motor age, in which a single expressway has the traffic-moving capacity of up to half a dozen ordinary wide streets.

"On with the Expressways"—can you tell us a project for your urban civic or business organization that will pay greater dividends?

★ "If We Only Had Loaders"

Old Man Winter played tricks again. He let the Northeast have nice open weather, and just as Spring buds started to show he came along with millions of tons of snow, beautiful snow.

Milwaukee is still talking about the record 18-inch snowfall, accompanied by high wind which literally paralyzed the city—after mild weather that lulled everyone.

California had a freak blizzard. So did southeastern Colorado. And later even Florida got a whiff.

★ They Couldn't Dodge

Cities got hit the worst this past winter, and as usual, their officials were less prepared to cope with snow than rural highway authorities.

"If we only had more loaders" was the cry.

Milwaukee's councilmen did the characteristic thing by approving emergency purchase of a half-million dollars' worth of snow equipment at once—after the storm.

But Milwaukee and virtually all cities in the snow belt are badly under-equipped, and most of them will probably settle down to sleep now that warm sunny days are due again.

Most of the equipment, such as trucks and loaders, is useful the year around; buying needn't be seasonal. The time to plan for future snow removal and begin going after the necessary new equipment is now.

Memphis has joined the list of cities without street railways. Buses have taken over there, as in hundreds of other sizable places.

In commenting nostalgically on the streetcar's demise, a local newspaper editorialized that the streetcar's fault was that it couldn't dodge. In short, it stayed out in the middle of the street, where it wended its weary way while queues of impatient motorists single-filed behind.

Where street railway service remains its service is being revitalized by streamlined new cars that are quick on the pick-up. There you have the three essentials of the modern motor bus or trolley bus, which is here to stay and moreover is vitally needed in larger cities. They can load at the curb, they can dodge and tack with traffic. And as being designed today they can accelerate and brake with the auto stream. Thus being able to merge with traffic rather than impede it, they relieve congestion and must be considered as a definite element in expressway planning, in which the relief afforded by ten or twenty auto loads of folks being transported in one medium-sized bus is a measureable relief indeed.

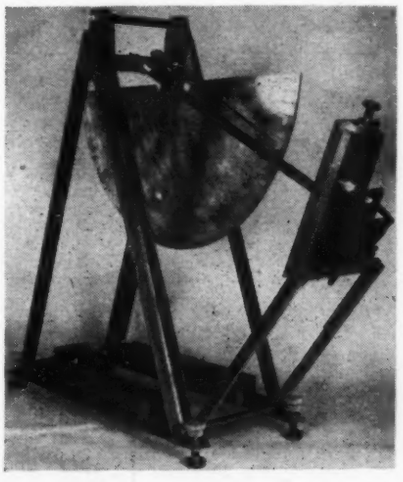
Expressways in larger centers will hence have controlled access for bus passengers as well as autos, and such details as loading lanes and platforms and bus terminals downtown, etc., are in an interesting state of transition on the drafting boards.

Measurement of Walkway Slipperiness

Slippery walkway surfaces are responsible for a large number of serious injuries and accidental deaths every year. In order to eliminate as far as possible such hazards, a joint research project has been undertaken by the National Safety Council and the National Bureau of Standards directed toward developing safety codes for walkways and footwear. The Council is engaged in collecting data regarding accidents and in making a statistical study to show the circumstances under which accidents from falls occur. The object of the Bureau's investigation is to develop methods for measuring the slipperiness of walkway surfaces under conditions of use and to apply these methods in selecting materials and methods of maintenance for both walkways and footwear that will reduce the frequency of accidents from falls.

Probably the most common way of improving the antislip characteristics of paving and flooring materials is to provide a roughened surface.

The establishment of safety codes for walkway surfaces and footwear has been materially handicapped by the lack of adequate methods of measuring slipperiness. Slipperiness is not a constant of the walk-way or the footwear but is a function of both surfaces and is materially affected by their condition. The correlation between coefficient of friction as commonly measured, and slipperiness as actually experienced is not good, especially where wet surfaces are involved. As an aid in the design of testing instruments, the National Bureau of Standards is making a study of walking habits. P. A. Sigler of the Bureau has designed a portable impact-type slipperiness tester that can be used to test floors in actual service. The design is based on the premises that slipping is a function of two surfaces.



★ Portable impact-type slipperiness tester designed and constructed at the National Bureau of Standards for measurement of the relative slipperiness of different walkway surfaces for various types of footwear.

The instrument is primarily a compound pendulum which sweeps a mechanical shoe material over the test surface.

"Antislip coefficients" for walkway and footwear surfaces can be computed. The antislip coefficients for concrete blocks ground with carborundum prior to testing ranged from 0.37 to 0.65, whereas the coefficients for a concrete floor with a cement-mortar topping, worn smooth over 25 years of service, ranged from 0.19 to 0.52. These results demonstrate the importance of surface condition and the inadvisability of assigning a single coefficient or even a single range of coefficients to one type of flooring.

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Road Contractors Ask Arbitration Policy Changes

The highway contractors of North Carolina want a new method of arbitration of contested contract settlements, Charles Ross, general counsel for the Carolina Road Builders' Association, told the Highway Commission here February 12.

Speaking at the monthly Commission meeting, the former highway chairman said the contractors would like an improved "right of appeal" for settlement of disputed highway contracts.

He said his clients did not approve of the present arbitration policy whereby the Chairman appoints a committee from the Commission to hear and settle claims from contractors on disputed contracts.

Postpones Action

After much discussion of possible means of changing the arbitration policy, the Commission agreed to postpone action on the matter until Chairman A. H. Graham and Ross could formulate an arbitration plan agreeable to both the contractors and the highway department.

N. Y. State Experience with Anti-Stripping Compounds

Two general types of anti-stripping or wetting agents have been used by the New York state department of public works over a period of about four years, according to a statement from a member of the operations and maintenance staff, O. L. Ostrander, superintendent. One type is an aggregate treatment, the other a bituminous material treatment.

The Department has not directly purchased the wetting agents but has purchased the aggregates or the bituminous materials that have been treated with these agents.

Below are the respective specifications that have been used by the Department for the purchase of the aggregates or the bituminous materials that have been thus treated.

The treated materials purchased (aggregates or bituminous materials) were largely used by the maintenance forces for late fall or early spring patching of the highways. Good results have been obtained with both treated aggregates and treated bituminous materials.

Fortunately for New York State most of the aggregates in the state are hydrophobic in character, so a treated bituminous material or treated aggregates are not necessary for general bituminous construction or the surface treatment of highways.

Aggregates that are hydrophyllic in character may be approved by the Department for use in bituminous plant mixes, provided a satisfactory wetting agent is used in the mix. The wetting agent could be either an aggregate treatment or a bituminous material treatment. The mixes that have been made under these conditions used a treated bituminous material.

According to Mr. Ostrander the state still has under consideration the question of using treated bitumen in its large-scale mid-summer surface treatment work.

N. Y. State "Specs" for Treated Stone

General—The Broken Stone called for under this specification shall meet the requirements of the General Specifications of the Division of Highways, covering such aggregates, in reference to size and quality.

Additional Requirements — The stone shall be treated with a "Wetting Agent" which gives the stone the characteristic of being readily coated with bituminous materials when the treated stone is wet. The character of the Wetting Agent shall be such that it will not appreciably alter the setting and binding qualities of the bituminous material used as a coating on the treated stone for field service.

The stone treatment shall possess a permanence sufficient to permit the treated stone to be stored in an unprotected stock pile for a continuous period of any six months and at the end of that period be capable, when wet, of being coated with bituminous materials and this bituminous coating shall resist the stripping action of water.

Coating Test—The bituminous coating qualities of the treated stone shall be determined by the AASHO Method T59-42 for the Stone Coating Test, with the following exceptions: The size of stone used for the test shall be stone passing the ½ inch screen and retained on the ¼ inch screen; the surfaces of the treated stone used in making the test shall be wet when the test is applied: The bituminous material used in making the test shall be a rapid curing asphalt cutback meeting the requirements for Item 68 (RC-2).

Stripping Test—The mixture produced in the stone coating test shall be spread out in a loose layer, approximately ¾ of an inch thick and allowed to air season at normal laboratory temperature for 24 hours. A suitable size sample of the seasoned material shall then be placed in a glass jar fitted with a tight cover and completely covered with distilled water. The jar and contents shall then be allowed to stand for a period of 24 hours at normal laboratory temperature (approximately 70° F.). The sample shall then be vigorously shaken for a period of 15 minutes. The sample shall then be examined for stripping of the bituminous film from the aggregate.

Test Requirements—The stone surfaces shall be completely coated with a bituminous film in the Coating Test outlined above.

When subjected to the Stripping Test given above, the stone surfaces shall remain completely coated with the bituminous film.

Any treated stone, acceptable at the time of delivery, and which should fail to meet the above Coating and Stripping Requirements after 6 months storage in unprotected stock piles, shall be replaced with acceptable treated stone, by the contractor at no additional cost to the Department.

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Uniform Traffic Laws

Traffic engineers, road designers and other engineering personnel will be interested in the following statement, widely disseminated by the National Highway Users Conference.

Non-uniform traffic laws and regulations have plagued the motor driving public with traffic accidents, congestion, inconvenience, unusual restrictions and costs for many years. Highway users are confused, more times than not, over traffic regulations when driving in other communities. Traffic laws between the states, in many instances, are found to be conflicting, archaic, ambiguous and often illogical.

This handicap to modern highway transportation need not continue if the public generally is made aware that a Uniform Motor Vehicle Code is prepared for enactment in the states. Public support can hasten the day of uniform and easy-to-understand traffic regulations.

The Uniform Motor Vehicle Code was prepared, and has been brought up to date from time to time, by the National Conference on Street and Highway Safety. The Uniform Code is endorsed by practically every national organization with interest in the use of America's highways. Its adoption has been strongly recommended by Governors' Highway Safety Conferences in half the states.

At the present time, hundreds of non-uniform motor vehicle bills are pending in state legislatures. Nonconformity with the Uniform Motor Vehicle Code is particularly evident in proposed legislation related to speed limits, drunken driving penalties, financial responsibility, compulsory inspection, equipment, school bus regulations and accident reporting.

Thirty states have adopted, in close conformity, one or more acts of the Uniform Motor Vehicle Code (described briefly on the back page of the attached folder); but, no state has yet adopted them all. Uniform traffic laws have lagged furthest behind in the six New England States as a group.

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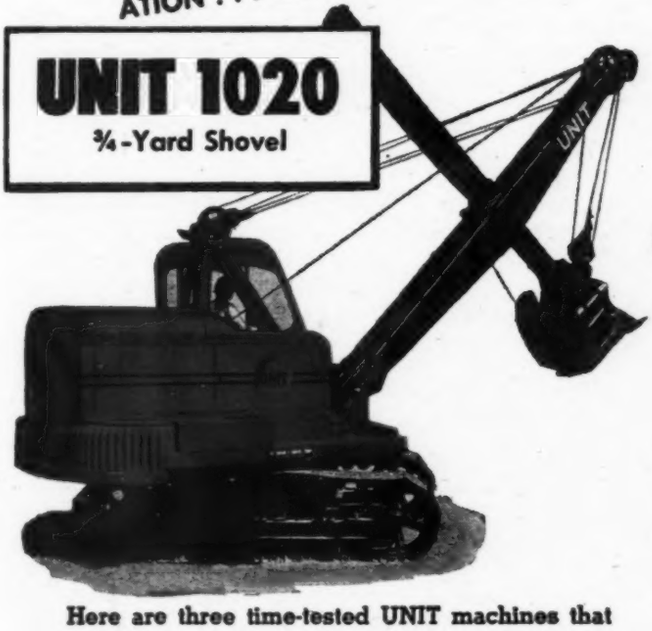

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Developments in Soil Mechanics

Notes from a thought-provoking talk by Earl F. Bennett, Soil Engineer, New York state department of public works, given before the recent North Atlantic States highway meeting at Atlantic City

MANY engineers still think that soil mechanics is too theoretical for highway construction and are continually looking for simplification. Structural soil mechanics is a means of studying soil stresses, and this conception if followed will greatly benefit any highway organization.

Much has been said about the classification of soils. Classification is nothing but a filing system, which helps get at data needed to do a given job. Structural soil mechanics goes beyond mere classification and gives the engineer a measure of the movement of water through a soil, its load capacity or structural limit, and other data essential in modern road design.

Round table discussion among soils engineers from the North Atlantic states has centered on the operation and use of soil mechanics and on the way soils engineers should be organized to function as a service group. This work must be properly organized to get things done. Most soils engineers as highway departments are presently set up, are charged with working through various divisions and this has proved an obstacle at times. For example, design men will receive soils data and relegate it to the files. Soils reports should go to the chief engineer or state highway engineer as is the case now in New York state. When this is the case the soils engineer and his staff in cooperating with other departments on an equality basis must prove the value of their service.

Soils engineering personnel under the best set-up falls into three groups. First are the office engineers—one or more of them—who work in contact with the bridge, maintenance and certain other departments to determine and discuss problems. This group sets up schedules of borings and necessary tests and submits reports.

Second is the operations group in the field. This group performs all borings, inspection, etc. Such work should be done under a soils engineer, but can be done by supplementary help from other departments. For this latter reason it is desirable that every engineer throughout the highway department learn to work with soils men. The field group is very important, since deficiencies or inaccuracies in borings cannot be made up in theoretical work. Proper equipment, procedure, report forms, etc., must be provided.

Third is the soils testing group, which is assigned tests on the basis of structural analysis of a problem and which reports tests back to the proper engineering group. This work should be under the direct supervision of a structural soils engineer well trained in testing and analysis.

Line Organization Needed

In many highway departments today the three foregoing groups are not part of a unified, coordinated division but are scattered under the bridge, design, materials and other divisions. The need is for a line organization for soils, under a single division or department head. Soils engineering requires specialists, and it takes a long time to develop specialists able to apply and correlate their work in cooperation with other divisions.

Let us consider some of the things that can be done through soils engineering.

Soils engineering helps in the proper survey of field conditions. In New York we are going more and more to the area concept of soils on the basis of origin, as compared to more elaborate groupings. Classification or strip maps are provided for proposed locations in which all types of preliminary soils data are shown. These maps show areas of good soils, poor soils, gravel deposits, ledge, etc., for the purpose of giving a basis of starting the work. It pays in saving time and in doing a better locating job.

One of the most important uses of soil mechanics is in relation to embankments and foundations. These subjects are coming more to the fore because of the increasing size of fills in modern highway designs. Fills of large area constitute a more serious problem than small bridge footings because of the total area weight and its complicating effects.

The highway engineer needn't be a soils specialist to figure out a few limiting facts in his head. For example, a 30-ft. fill places a load of about 4000 lb. per sq. ft. on the underlying soil. This is about three times the shearing stress limit of many ordinary soils. You thus know right off that you must have a stiff clay or other strong soil to carry a fill of this height without foundation settlement. A bank that high will certainly produce shear failures on mucks or vegetable clays, so something sensible must be done about it, such as to toe out the fill over a larger area, install vertical sand drains, replace the poor soil or take other procedures.

Compaction today is the most widely discussed subject relating to soil mechanics, yet practices continue to differ greatly. Some state highway departments have applied highly developed compaction procedures for fifteen years, others are still merely considering their use. The Public Roads Administration has aided in bringing about wider consideration of compaction control, and work by ARBA, HRB and other committees reflects a realization of the urgent importance of the subject.

Compaction cannot be properly controlled by one general specification. Each group of soils requires a different rolling procedure. Some soils are very critical as to moisture. In extreme cases as little as 1% moisture change will render a stable soil unstable. Contractors have learned, often better than engineers, that some soils, for example, become quick or quaky under heavy banking, that rolling is actually detrimental to some plastic clays, and so on. Or that there are expansive clays in which increased compaction cannot be maintained and a lower density must be allowed for in the foundation design. This is a worse problem than frost action in some areas.

These varying conditions must finally be reduced through laboratory

data to a set of working steps which the contractor can use to get his job done. Selection of the proper thickness of rolling layers is not as simple a matter as it seems. But the biggest problem is moisture control. Here is where the contractor's big risk comes in. There is as yet no satisfactory method of drying an excessively wet soil except by manipulation.

Third comes rolling, and here the engineer should not limit the contractor too closely to any one type of roller or procedure, but should give him leeway to get results the cheapest way.

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Pennsylvania Plans Roadside Planting Nursery

The Forestry Unit of the Pennsylvania Department of Highways to meet postwar planting needs, has initiated a replacement program at its own nursery for the planting of small shrubs and trees. In addition a start has been made to replace large sized stock with young usable material by establishing several hundred square yards of seed beds in which have been planted seeds of species most commonly used for roadside purposes. These species include coralberry, memorial rose, bittersweet, grey dogwood, flowering dogwood, Jersey tea and other less common varieties.

War-time cessation of planting resulted in an accumulation of over-age and over-size stock not profitably usable for highway planting.

It was agreed to permit its disposal as surplus to other state departments, civic organizations, state educational institutions and commercial growers.

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Sewer Faked by Manholes

According to a recent news dispatch, a group of irate towns-people at Harrison, N. Y., discovered after several hours of digging that 752 ft. of sewer which they supposed had run through their property since 1913 didn't exist. Manhole covers along the route of the phantom sewer were dummies. Town officials said those responsible for the fraud had been dead for years.

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Over 30,000 gallons of milk had to be dumped during one week-end by farmers in the Washington, D. C., area, due to the recent snow blockade. Thus a third of the city's normal milk supply, representing a value of some $20,000, was lost due to the unusual storm and lack of plowing facilities.

New Jersey Highway Department Reorganizes Construction Division

Bridge, Survey and Plans, and Electrical Given Full Division Status

In preparation for the accelerated program of Freeway and Parkway construction, together with other features of the New Jersey state highway department's post war plans, the Construction Division was recently subjected to changes designed to facilitate handling this extra volume of work.

In the past the Construction Division consisted of the northern, central and southern sub-divisions, together with the Survey and Plans, Bridge, and Electrical sub-divisions. These several component parts were under the supervision of C. F. Bedwell, construction engineer.

Under the new organization Survey and Plans, Bridge and Electrical will be separate divisions, as will the new Division of Construction, which will include the three geographical sub-divisions as heretofore. All four will be coordinated under Mr. Bedwell, who will now bear the title of Chief, Department of Design and Construction. Chester A. Burn will act as his deputy.

Other personnel changes effected by this new organization have resulted in the elevation of Harry D. Robbins, former Central Division Construction Engineer, to Engineer in Charge, Construction Division. Neil MacDougall, formerly Asst. District Engineer of Survey and Plans, in Newark, has taken over Robbins' former position, while Howard Rigby has been transferred from the Upper Montclair office to Newark. At the present time, Herbert Englishman is handling the affairs of the Montclair office.

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[Footnotes to tables, pages 58 and 59.]

[1]On secondary roads and with sands, no rolling is required and layers up to 12" are permitted. No density requirement specified for this type of work.

[2]Paid for at unit bid price per roller hour and unit bid price per M gal. of water, which amounts to 7½c to 8c per cu. yd.

[3]Expect to secure the maximum compaction obtainable with a given soil containing a suitable moisture content and the specification amount of rolling.

[4]Extra rolling average cost, $3.93 per hour.

[5]90% California Standard is the minimum requirement. Expect to secure the maximum compaction obtainable with a given soil containing a suitable moisture content and the specification amount of rolling.

[6]U.S.E.D.—Highways in some cases $2 to $3 per M gal.; 95% Mod. AASHO; 6" Minimum; No pay item.

[7]U.S.E.D.—Airfields in some cases $2 to $3 per M gal.; 90%-100% Mod. AASHO; Varies with wheel load & soil types*; No pay item.

*The following is a table of Compaction Requirements for Flexible Pavements. (Airfields).

TABLE 1
COMPACTION REQUIREMENTS

	Depth in Inches Below Pavement Surface to Which Indicated % of Mod. AASHO Density Should Extend			
	All Subgrades Except Cohesionless Sands		Cohesionless Sands	
Wheel Load	100%	95%	100%	95%
5,000	..	..	..	12
15,000	..	12	12	24
40,000	12	18	24	36
60,000	18	30	30	48
150,000	30	54	48	78

Compaction—How States Specify it Today

See Next Page ➡

Wide variation in highway grade compaction requirements is revealed by a Highway Research Board committee's tentative summary, presented at the Board's recent annual meeting

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During 1946 the state highway departments were questionnaired on their embankment compaction methods and requirements by the Highway Research Board Committee on Compaction of Subgrades and Embankments. Data thus gathered were presented by committee chairman L. D. Hicks of North Carolina at the December meeting of the Board in Washington, D. C., with expectations that a revised report will eventually be issued on the subject. Reproduced in the following pages is the final tabulation of the committee's survey.

Embankment Compaction—How States Specify it Today

State	Are embankments constructed in layers? What thickness?	What method of compaction is used for various soils?	Compaction requirement and measurement	Is specified requirement met?	Is "optimum" moisture for compaction specified?	Is compaction paid for directly? What is the cost?
NORTH-EAST						
Maine	12" max.	Smooth or pneumatic rollers	Satisfactory		No	No
New Hampshire	8"-12"	Tamping and smooth rollers	Satisfactory	Yes	No	No
Vermont	12"	Tamping rollers	6 trips of roller—minimum	Yes	No	No
Massachusetts	12"	Tamping and smooth rollers	1 roller per 100 cu. yds. per hr.	Yes	No	No
Connecticut	12"	Equipment	Satisfactory	Yes	No	No
Rhode Island	24"	Smooth rollers	Satisfactory	Yes	No	No
New York	6"- 8"	Smooth, tamping & pneumatic rollers	90% AASHO minimum	Yes	Yes	No
Michigan	8"-12"	Tamping and pneumatic rollers	95% AASHO	Yes	Yes	No
Wisconsin	8"-12"	Equipment, tamping rollers—special	Special—95% AASHO	Yes		Special—5c per cu. yd.
MIDDLE-EAST						
Illinois	6" max.	Tamping, smooth and pneumatic rollers	6 to 9 trips. Also 90% AASHO	Yes	Yes	No
Indiana	6"- 9"	Smooth and tamping rollers and tractors	90%-95% AASHO	Yes	Density only	No
Ohio	8"	Tamping and smooth rollers	90%-102% AASHO	Yes	Yes	No
Pennsylvania	8"	Tamping and smooth rollers	Satisfactory	Yes	No	No
New Jersey	6"	Smooth, tamping and pneumatic rollers	4 to 8 passes of rollers	Yes	No	No
Kentucky	12"	Tamping and pneumatic rollers	90%-100% AASHO	Yes	Yes	No
Tennessee	6"	Tamping rollers	100% AASHO	Yes	Yes	No
West Virginia	8"	Tamping and smooth rollers	90%-100% AASHO	Yes	Density only	No
Virginia	8"	All type rollers,	95% AASHO	Yes	Yes	No
Maryland	8"	Tamping and smooth rollers and equipment	90%-100% AASHO	Yes	No	No
Delaware	6"	Tamping rollers	95% AASHO	Yes	Yes	No
Dist. of Columbia	6"	Smooth and tamping rollers	90%-100% AASHO	Yes	Yes	No
SOUTH-EAST						
Mississippi	6"	Tamping rollers	Satisfactory	Yes	Where practicable	No
Alabama	8"	Tamping, smooth and pneumatic rollers	95% AASHO	Yes	Yes	No
North Carolina	6"	All types of roller	2 trips per inch loose thickness of layer	Yes	No	No
South Carolina	6"	Equipment, tamping rollers and jetting	Satisfactory	Yes	No	No
Georgia	6"	Tamping and pneumatic rollers	5 trips of roller—minimum	Yes	No	No
Florida	6"	Tamping rollers and tractors	Satisfactory	Yes	No	No
NORTH-CENTRAL						
Minnesota	12" Max.	Tamping rollers	6 to 12 trips of roller 95%-100% AASHO	Generally	No	No

From Highway Research Board Committee Survey

Is water paid for directly? What is the cost?	What is the requirement for subgrade compaction?	What is the depth of this requirement?	What is the cost?	Is moisture density procedure used in compaction?	What personnel and equipment are required for inspection when this procedure is used?	State
						NORTH-EAST
No	Same as for emb.			No		Maine
No	Satisfactory rolling			No		New Hampshire
No	Same as for emb.			No		Vermont
No	Satisfactory rolling			No		Massachusetts
No	Satisfactory rolling			No		Connecticut
No	Same as for emb.			No		Rhode Island
Special	95% AASHO	48" in emb.		Yes	2 men, scales, compaction kit, field density apparatus, gasoline, stove, etc.	New York
No	Satisfactory rolling			Yes	1 man, scales, compaction kit, field density apparatus, oven, etc.	Michigan
No	Same as for emb.			Special only		Wisconsin
Force acct.	Special	Variable	Not given	Yes	1 man with density apparatus, compaction test equipment, scales, oven.	**MIDDLE-EAST** Illinois
No	Same as for emb.	6"	No pay item	Density control	1 man with density apparatus, scales, etc.	Indiana
$3 per M. gal.	95%-105% AASHO	6"	No pay item	Yes	1 man with density apparatus, compaction test equipment, penetrometer scales, oven, etc.	Ohio
No	Satisfactory rolling	Not specified	No pay item	No		Pennsylvania
No	Same as for emb.			No		New Jersey
$1.50 per M. gal.	Satisfactory rolling		No pay item	Special work	2 men with density apparatus, oven scales, etc.	Kentucky
$3 per M. gal.	Satisfactory rolling		No pay item	Yes	1 man with density apparatus, oven scales, etc.	Tennessee
$5 per M. gal.	Satisfactory rolling	6"		Yes	1 to 3 men, density apparatus, oven scales, etc.	West Virginia
No	Same as for emb.	8"	No pay item	Yes	1 man wtih density apparatus, compaction test equipment, oven, scale.	Virginia
No	Same as for emb.		No pay item	Yes	1 man wtih density apparatus, compaction test equipment, oven, scale.	Maryland
No	Same as for emb.		No pay item	Yes	1 man and helpers with density apparatus, compaction test equipment, oven, scales, etc.	Delaware
No	Same as for emb.		No pay item	Yes	1 man with density determination equipment, scales, etc.	Dist. of Col.
No	Same as for emb.			Yes	Field laboratories.	**SOUTH-EAST** Mississippi
No	100% AASHO	6"	No pay item	Yes	1 man with density apparatus, ovens, scales, etc.	Alabama
No	Same as for emb.			No		North Carolina
No	Satisfactory rolling		No pay item	No		South Carolina
No	Same as for emb.		No pay item	Special work	1 man and necessary equipment.	Georgia
No	30 to 60 psi bearing	12"	10c to 15c per sq. yd.	No		Florida
$4 per M. gal.	Extra rolling	12"	No pay item	Special work	1 man with density determination equipment, compaction test equipment, scales, stove, etc.	**NORTH-CENTRAL** Minnesota

Embankment Compaction — How States Specify it Today

State	Are embankments constructed in layers? What thickness?	What method of compaction is used for various soils?	Compaction requirement and measurement	Is specified requirement met?	Is "optimum" moisture for compaction specified?	Is compaction paid for directly? What is the cost?
Iowa	6"	Tamping rollers	6 to 12 trips of roller		No	No
Missouri	6"	Tamping rollers	90% AASHO	Yes	Density only	Yes, cost 7c per cu. yd.
South Dakota	6"	Tamping rollers	Satisfactory		No	No
North Dakota	10"	Tamping rollers	90% AASHO	Yes	Special	No
Nebraska	6" [1]	Tamping or smooth rollers	90% AASHO	Yes	Special	No
Kansas	6"	Tamping and pneumatic rollers	90% AASHO	Yes	Density only	Yes, cost 3.9c per cu. yd.
SOUTH-CENTRAL						
Arkansas	10"	Tamping and pneumatic rollers	Satisfactory		No	Yes, cost 3c per cu. yd.
Louisiana	8"	Tamping rollers and tractors	95% AASHO	Yes	Yes	No
Oklahoma	6"	Tamping and pneumatic rollers	Satisfactory	Yes	Yes	Yes, roller-hr.
Texas	6"- 8"	Tamping and pneumatic rollers	90% AASHO	Yes	Yes	Yes, cost 3.5c per cu. yd.
MOUNTAIN						
Montana	8"	All types of rollers and equipment	90%-100% AASHO	Yes	No	Special, cost 2.5c per cu. yd.
Idaho	8"	All types of rollers	90%-100% AASHO	Yes	Density only	Yes, $4 to $6 per roller—hr.
Wyoming	5"	Tamping and pneumatic rollers	Satisfactory	Yes	No	Yes, $3.50 per roller—hr.
Utah	8"	Tamping rollers	90%-100% AASHO	Yes	Yes	[2]Yes, 7½c per cu. yd.
Colorado	8"	Tamping and smooth rollers	90%-100% AASHO	Yes		Yes, $3 per roller—hr.
Nevada	8"	Tamping and smooth rollers and equipment	85%-90% AASHO—Mod.	Yes	Yes	Yes, 4c per cu. yd.
New Mexico	3"- 6"	Tamping, smooth and pneumatic rollers	90%-100% AASHO	Yes	Yes	No
Arizona	12"	Tamping and pneumatic rollers and equipment	95% AASHO	Yes	Yes	Yes, 5c per cu. yd.
PACIFIC						
Washington	4"-24"	Tamping and smooth rollers and equipment	95%-100% AASHO	Yes	Yes	No
Oregon	8"	Tamping and pneumatic rollers	95% AASHO	Yes	No	No
California	6"- 8"	Tamping and smooth rollers	[3]90% Cal. Standard—minimum	Yes	Density only	No
U.S.E.D.	6" Compacted	Tamping and pneumatic rollers and smooth and crawler type equipment	90% Mod. AASHO	Yes	Yes	Optional
Yards and Docks, Navy	12"	Tamping, smooth and pneumatic rollers	90%-95% AASHO	Yes	Yes	No

See preceding page 55 for footnote for this page and opposite page.

From Highway Research Board Committee Survey

Is water paid for directly? What is the cost?	What is the requirement for subgrade compaction?	What is the depth of this requirement?	What is the cost?	Is moisture density procedure used in compaction?	What personnel and equipment are required for inspection when this procedure is used?	State
No	95% AASHO	6"	$400 to $1,300 per mi.	Subgrades only	1 man, necessary equipment.	Iowa
80c per M. gal.	Same as for emb.	12" and 18"	50c per cu. yd.	Yes	1 man with density determination equipment, compaction test equipment, scales, stove, etc.	Missouri
$2.25 per M. gal.	Same as for emb.	12"	No pay item	No		South Dakota
$2 per M. gal.	Same as for emb.	Same as for emb.	No pay item	Special work	Necessary equipment for compaction test and embankment density determination.	North Dakota
$1 per M. gal.	Same as for emb.	6"	No pay item	Yes	1 man with each outfit equipped with all necessary compaction test and density equipment.	Nebraska
24c per M. gal.	Same as for emb.	6"	3.9c per cu. yd.	Special work	All necessary equipment for compaction test and embankment density determination.	Kansas
						SOUTH-CENTRAL
Yes, M. gal.	Same as for emb.	8"	No pay item	No		Arkansas
No	Same as for emb.			Yes	1 man and necessary equipment for compaction test and embankment density determination.	Louisiana
$1.90 per M. gal.	Same as for emb.	6" to 12"	10c per sq. yd.	Special work	1 man for each outfit equipped with necessary equipment for compaction test and density.	Oklahoma
$1.50 per M. gal.	Same as for emb.	6" to 8"	3c to 3½c per cu. yd.	Yes	1 man with equipment necessary for performing compaction, density tests.	Texas
						MOUNTAIN
$2 per M. gal.	Same as for emb.	8" including cuts	2c to 3c per cu. yd.	Yes	Necessary men and equipment for performing compaction and density tests.	Montana
$1.50 per M. gal.	Same as for emb.	8" including cuts	$30 to $45 per day	Density control	1 man with each outfit with necessary equipment for deter. dry densities.	Idaho
$2 per M. gal.	Same as for emb.	12" including cuts	No pay item	Yes	1 man with each outfit with compaction and density equipment, penetrometer, stoves, scales, etc.	Wyoming
$1.63 per M. gal.	[4]Extra rolling	Not specified	[4]No pay item	Yes	2 men and necessary equipment for compaction test and density determination.	Utah
$1.50 per M. gal.	Same as for emb.	12"	$3 per hr. for roller	Yes	2 men and necessary compaction and density test equipment.	Colorado
3c per cu. yd.	Same as for emb.	6"	Roll. hr. 3c per cu. yd.	Yes	1 man with small field laboratory for compaction and density tests.	Nevada
$3 per M. gal.	95% AASHO	6"	No pay item	Yes Subgrades only	1 man with compaction and density equipment.	New Mexico
$3 per M. gal.	Same as for emb.			Yes	1 man with compaction and density equipment.	Arizona
						PACIFIC
$2.50 per M. gal.	Same as for emb.	12" including cuts	No pay item	Yes	1 man with compaction and density equipment.	Washington
$2.75 per M. gal.	Same as for emb.	Not specified	No pay item	Yes	1 man with compaction and density equipment.	Oregon
$2 per M. gal.	[5]90% cal. std.	6"	No pay item	Yes	1 man with compaction and density equipment.	California
No	•	•	•	Yes	1 man with each outfit with compaction and density equipment.	U.S.E.D.
No	Extra rolling	6" to 18"	No pay item	Yes	2 men with equipment for determining moisture and density tests.	Yards and Docks, Navy

(Continued on page 62)

Notes On Shoulder Maintenance

Shoulders need to be cut down along secondary roads, and built up and stabilized along arterial highways

By Warren K. Myers
Chief Maintenance Engineer
Pennsylvania Dept. of Highways
Harrisburg, Pennsylvania

PENNSYLVANIA is the No. 1 state as to mileage of secondary highways coming under state responsibility. Over 27,000 miles of blacktop, just to mention one item. Maintenance of these roads is a really big operation, and that goes for any part of the job—including shoulders, for example. One of the most widespread problems is the cutting down of high berms. Berms built up too high for one reason or another result in confinement of surface water on the pavement area, and poor drainage with its attendant ills is an inevitable result unless berms or shoulders are corrected.

The procedure in Pennsylvania is to start cutting down with a blade, picking up excess material and loading it onto trucks by means of either belt-type or vertical-lift loaders mounted on small tractors. Complete mechanization of this simple operation has speeded up the work and kept the cost to within about $125 per mile.

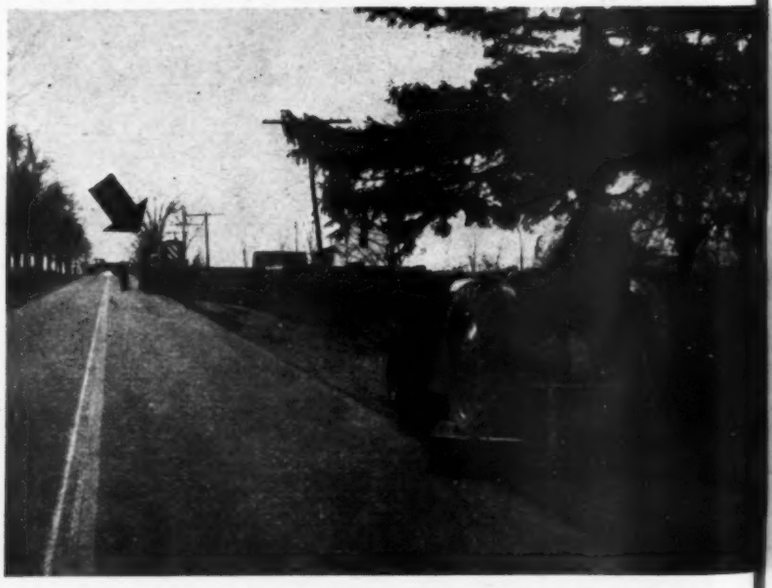
Low Shoulders Along Arterials

After extensive experience in berm correction of this kind, it has become standard practice now in Pennsylvania to go over all secondary roads, cutting down shoulders where necessary before applying surface treatment.

Whereas high berms are a problem on secondary roads, a common trouble along arterial highways is

(*Continued on page* 125)

Michigan State Forces Watch Ruts Along Slab Edges



★ Here are two variations in equipment currently employed by the Michigan state highway department maintenance crews. Both have a very important purpose: to keep shoulders smoothed during thaws and after rains. Upper scenes show a tow-type unit with adjustable blade. Fastened behind is a special shop-built auxiliary blade which extends about 12 in. over the pavement and lays gravel against the slab edge. The lower scenes show the same result accomplished by small tractor-drawn one-man shoulder maintainer, equipped with adjustable blade and brush. Heavy arrow shows stove-heated "lift-offable" house set in truck bed to shelter men in cold weather.

Jack of many trades -and master too!

The Tractair is extremely versatile. Here you see a backfilling application.

The versatility of LE ROI 105 TRACTAIR reduces time and costs on all kinds of jobs

Every day, many of you must have hundreds of little nuisance jobs to do — jobs that can be done better, faster, and at less cost with air power. If so, here's just the unit you've been looking for — Le Roi's new Tractair.

Tractair is the only completely integral tractor-compressor available. It is neat, compact, sturdy, and combines the utility of a 105-cfm compressor with the versatility of a 35-hp wheel tractor.

It is designed for interchangeable "front-end" equipment such as loader, snow plow, rotary broom, backfill blade, cargo and material lifts, crane arm, etc. It can also be equipped with a Le Roi mowing attachment.

Truly a multi-purpose unit, Tractair sweeps, mows, and loads— tows, plows, and pulls—drills, bores, and digs. Its remarkable mobility brings all these services to places heretofore inaccessible.

Powered with the famous Le Roi heavy-duty valve-in-head engine, and Econotrol-equipped, Tractair provides unusual economy along with its money-saving usefulness. Ask your Le Roi distributor about Tractair today — write for latest bulletins. They list complete specifications.

Le Roi-Cleveland Rock Drills

*Le Roi Airmaster**

Le Roi Heavy-Duty Engine

Le Roi Engine-Generator Set

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

NEW YORK • WASHINGTON
CLEVELAND • MILWAUKEE • BIRMINGHAM
TULSA • BUTTE • SAN FRANCISCO

*Reg. U.S. Pat. Off.

T-9

(Continued from page 59)

Embankment Compaction — How States Specify it Today

State	Minimum field tests for embankment compaction control		
	Moisture tests	Density tests	Other tests
NORTH-EAST			
Maine			
New Hampshire	As required	As required	None
Vermont	None	None	
Massachusetts	None	None	None
Connecticut	None	None	None
Rhode Island	None	None	None
New York	1 every 3 hrs.	1 every 3 hrs.	
Michigan	4 per day	4 per day	Check tests
Wisconsin	As required	As required	
MIDDLE-EAST			
Illinois	Not specified	Not specified	
Indiana	None	As required	
Ohio	As required	As required	None
Pennsylvania	None	None	None
New Jersey	None	None	None
Kentucky	As required	As required	
Tennessee	As required	As required	
West Virginia	Each lift	Each lift	
Virginia	4 per day	4 per day	
Maryland	As required	As required	
Delaware	As required	As required	None
District of Columbia	As required	As required	
SOUTH-EAST			
Mississippi	As required	As required	
Alabama	As required	As required	
North Carolina	None	None	None
South Carolina			
Georgia	As required	As required	None
Florida	Visual	None	None
NORTH-CENTRAL			
Minnesota	As required	As required	None
Iowa	As required	As required	None
Missouri	As required	As required	As required
South Dakota	None	None	None
North Dakota	4 per day	4 per day	Penetrometer
Nebraska	As required	As required	As required
Kansas	As required	As required	None
SOUTH-CENTRAL			
Arkansas	None	None	None
Louisiana	1 per 1,000 ft.	1 per 1,000 ft.	
Oklahoma	2 per lift per soil	2 per lift per soil	
Texas	1 for each soil	1 for each soil	Density
MOUNTAIN			
Montana	As required	1 per 5,000 c.y.	None
Idaho	1 per 500 c.y.	1 per 500 c.y.	None
Wyoming	As required	1 per 2,000 c.y.	
Utah	1 per 2,000 c.y.	1 per 2,000 c.y.	L. L. & P. I.
Colorado	As required	1 per 2,000 c.y.	
Nevada	As required	As required	
New Mexico	1 per 2,000 c.y.	1 per 2,000 c.y.	None
Arizona	As required	As required	None
PACIFIC			
Washington	As required	As required	
Oregon	As required	As required	
California	As required	As required	
U.S.E.D.	As required	As required	
Yards and Docks, Navy	As required	As required	L. L. & P. I.

From Highway Research Board Committee Survey

How are moisture determinations made?	How are field density determinations made?	Are changes in specification requirements contemplated?	How are wet soils dried out in embankment construction?	State
				NORTH-EAST
None made	None made	No statement	No statement	Maine
Oven drying	On undisturbed samples—paraffin coated	Possible	Aeration	New Hampshire
	None made	Yes	Aeration	Vermont
None required	None required	No	No procedure specified	Massachusetts
None required	None made	Yes, by special provision	No experience	Connecticut
	None made	Yes		Rhode Island
Drying in pan over stove	Balloon apparatus	No	Aeration	New York
Drying in oven in laboratory. Over stove in field	On undisturbed samples and balloon apparatus	No	Aeration	Michigan
Drying in oven	Sand method	Yes	Aeration	Wisconsin
				MIDDLE-EAST
Alcohol method and drying over stove	Sand method	No	Aeration	Illinois
Drying over stove	Sand method	No	Aeration	Indiana
By penetrometer reading on sample compacted in mold and wet weight	Sand method	No	Aeration	Ohio
Not made	Not made	No	Aeration	Pennsylvania
Drying over stove	Not made	Yes	Aeration	New Jersey
Drying over stove	Sand method	No	Aeration	Kentucky
Drying over stove	Balloon method	No	Aeration	Tennessee
Drying over stove	Sand method	No	No statement	West Virginia
Drying over stove	Sand method	Yes	No definite method	Virginia
Not determined	Sand method	Yes	Aeration	Maryland
Drying over stove	Sand method	Yes, Mod. AASHO	Aeration	Delaware
Drying over stove	Sand method	No	Aeration	Dist. of Col.
				SOUTH-EAST
Oven drying and drying over stove	Sand method	Yes, to specify density	No statement	Mississippi
Drying over stove	Sand method	Yes, variable density requirement	Aeration	Alabama
Not determined	Balloon apparatus	No	Aeration	North Carolina
Drying over stove or in oven	Sand method	No	No statement	South Carolina
Drying ever stove	Sand method	Yes, to specify density	Aeration	Georgia
Not made. Visual inspection used	None made	Possible	Aeration	Florida
				NORTH-CENTRAL
Sample placed in air-tight can and dried in lab. oven	Sand method	No	Aeration	Minnesota
Drying over stove	Heavy oil method	No	Aeration	Iowa
Drying over stove	Sand method	No	Aeration	Missouri
Not determined	None made	No	Aeration	South Dakota
Drying in oven	Heavy oil method. Also, penetrometer reading	No	Aeration	North Dakota
Drying in oven or over stove. Also by penetrometer reading	Undisturbed sample, sand, and heavy oil methods	Yes	Aeration	Nebraska
Drying over stove	Sand method	No	Mix with dry soil or aeration	Kansas
				SOUTH-CENTRAL
Not determined. Visual inspection used	None made	Yes, moisture density control	Aeration	Arkansas
Drying in oven	Sand method	No	Aeration	Louisiana
Drying in oven	Sand method	No	Aeration	Oklahoma
Drying in oven	Balloon apparatus	Yes, increased density requirements	Aeration	Texas
				MOUNTAIN
Drying in oven	Heavy oil method	No	Aeration	Montana
Drying over stove	Sand method	No	Aeration	Idaho
Drying over stove	Sand method	Yes, heavier rollers	Aeration	Wyoming
Drying in oven	Sand method	Possible by special provisions	Aeration	Utah
Drying over stove	Sand method	No	Aeration	Colorado
Drying over stove		No	Aeration	Nevada
Drying in oven. Also, alcohol method	Sand method	No	Aeration	New Mexico
Drying over hot-plate or in oven	Sand method	No	No problem	Arizona
				PACIFIC
Sample placed in air-tight can. Dried in lab. oven	Sand method	Yes, more rigid compaction control	Aeration	Washington
Drying over stove or in oven	Heavy oil and sand methods	Yes, bid price for compaction	Aeration	Oregon
Drying in oven	Sand method	No	Aeration	California
Drying over hot-plate or in oven	Heavy oil, balloon, sand, and undisturbed samples	Yes, variable density requirements	Aeration	U.S.E.D.
Drying in oven	Sand method	No	Aeration	Yards and Docks, Navy

A Highway Builder Looks at

Highway Engineering

Engineers and contractors *together* get the roads built. Engineering practices that help the contractor also help produce the most road per construction dollar. Read these thoughts and recommendations from a successful contractor who also speaks for one of our national contractor organizations—*Editor*.

By Dwight W. Winkelman

President, D. W. Winkelman Co., Syracuse, N. Y., and Vice Pres., Associated General Contractors of America, Inc.

PROSPECTS for 1947 are for stabilizing prices and an expanded construction volume, but several problems must be solved, and we must reach a better understanding of our mutual problems. As I see it, the immediate problem of vital importance to contractors and highway officials is two-fold:

First, getting our own houses into order by using every device at our command to provide the public with more and better highways as economically and efficiently as possible.

Second, the public relations program of justifying highway costs, and letting the public know that it is getting highways of constantly improved design.

Highway Costs

As a premise in considering highway costs, it must be borne in mind that price increases are not confined to highways or to construction.

The ultimate level of construction costs is impossible of prediction at this time, but I believe they will rise somewhat during the coming months, though not substanially. Wars are inflationary, and the tremendous expense of the last war has served to reduce the purchasing power of money, and therefore has raised the price structure.

I believe that now and for some time in the future, local officials, state highway departments, the Public Roads Administration, and the public will have to become adjusted to new costs for highway construction which will be higher than in prewar times, but in line with costs of other services and commodities.

D. W. Winkelman
(As snapped at recent AGC Convention)

Along with that belief, I want to make the statement, and emphasize it, that in my judgment the strongest force for the reduction of highway costs in the future will be the competition within the construction industry for more efficient methods of producing the highways of constantly improved quality which you will design.

The immediate goal, therefore, is stabilization of construction costs, concurrent with the ability of the contractor to make a firm bid on a competitive basis as uncertainties are removed.

Elements of Highway Cost

Responsibilities for the components of highway costs are far flung.

Within the contractor's control are such components as the selection of the method, personnel and equipment for performing the work and, of course, the energy to be exerted in carrying out his operations.

The contractor, on the other hand, exercises little or no control over such components as design of the project, specifications for quality and workmanship, type of materials to be used, width of road, depth of pavement, straightness of alignment and reduction of grades, and many others.

Then there are elements of cost stemming from taxation, labor laws, regulations, requirements to keep records, and others over which he exercises little or no control. These are just as real elements of costs as are payrolls and materials, and must be understood in any consideration of present and future highway costs.

I would like to discuss now a few of the major trends which have brought about some of the current increases in highway costs.

Highway Construction and Labor

Currently, many contractors face uncertainties over wage rates, the availability of labor, and its efficiency. It is difficult to generalize on them because there is much variation between sections of the country and individual projects. It can be anticipated that in time these uncertainties will disappear or be greatly alleviated.

There is a national trend toward higher wages and salaries, and it is inevitable that highway wages should be influenced. In most sections of the country highway wages increased during the war partly because other wages increased, and partly because contractors had to pay more to secure men.

From a paper given before the Association of Highway Officials of the North Atlantic States, Atlantic City, Feb. 27, 1947.

Barber-Greene

Presents

the NEW SNOW LOADER with new speed, new mobility and new usefulness!

BG Model 548

Year-round usefulness; The model 548 may be converted to a B-G Bucket Loader for use during the "no-snow" seasons.

Here's the most important snow-removal news since the introduction of the first B-G Snow Loader twenty-five years ago! The model 548 brings pneumatic-tired speed and mobility to the job of minimizing snow storm expense and traffic tie-ups. Completely new in design, the 548 has speed features that include a four-wheel drive with massive tires that buck windrows without slippage. It travels to the job at 10 miles per hour, and clutches may be disengaged for easy towing. For added loading speed, it is designed to allow trucks to travel in the same direction while loading; and its retractable discharge conveyor extends well over the truck cab to minimize spillage. Works right to the curb. Clearance in operating position is only 11 feet, 3 inches. Illustrative literature available on the 548 and also the 538 Crawler-Mounted Snow Loaders by writing Barber-Greene Company, Aurora, Illinois.

BG BARBER-GREENE COMPANY · AURORA, ILLINOIS

Constant Flow Equipment

LOADERS · PERMANENT CONVEYORS · PORTABLE CONVEYORS · COAL MACHINES · BITUMINOUS PLANTS · FINISHERS · DITCHERS

In the past, much highway work was undertaken on an open-shop basis and in rural communities in which the rural wage rate prevailed. Labor unions now are growing and an increasing amount of highway construction is being done by union labor. Construction of super highways has served as an opportunity for unions to organize highway work and project higher wage scales into rural territories.

Efficiency of Labor

Inefficiency of labor in construction work has been a topic of much discussion since the end of the war.

It is impossible to give an estimate of present efficiency percentage in comparison with prewar years. In some locations and under certain conditions labor is less efficient now, even at the higher rates of pay, than it was in 1940.

So-called common labor is scarce and is less efficient. One of the principal reasons is because many men who were experienced construction workmen, during the war obtained semi-skilled and skilled occupations in shipyards, factories and other types of work. The men who have been recruited to take their places are less experienced, and in many instances are not as much interested in their work as their predecessors who were proud of being a part of a successful construction organization.

While it will take time to overcome labor shortages, highway chapters of the AGC are being encouraged to step up training programs in order to train as fast as possible men who desire to enter the industry.

The most important factor in the decrease in labor efficiency has been the inability to obtain delivery of material when and as required. It is unreasonable to expect men working on a job to use up available materials in a hurry, and then be laid off for brief periods to wait for more materials.

It is expected that this factor will be lessened substantially with higher materials production this year. With the increased rates of pay, it is increasingly important that operations may be scheduled so that materials will be delivered to the job when needed to keep it going.

Cooperation with Labor

During the war and previously, state highway departments and A.G.C. chapters worked closely together in arriving at wage rates to be determined by the department, or approved by the government. I believe that in the future consultations between representatives of labor, contractors and highway departments will become necessary in the development of sound wage rates. Development committees of the AGC and the Building and Construction Trades Department of AFA are working out procedures for the National Joint Conference Committee, plans for which were recently announced by President Truman, to furnish adequate machinery for voluntary settlement of disputes in the construction industry.

This joint committee, according to the agreement, will have separate committees for handling disputes or disagreements in each branch of construction. It is provided that the committee to handle disputes in the highway field will be composed of a member from the AGC who is representative of the highway and road construction industry, and one member of a labor organization whose members are predominantly employed in highway and road construction.

This is one of the ways in which our organization is continuing efforts to provide the highest possible measure of industrial peace in construction.

In the development of sound wage rates you can count on the cooperation of the AGC, only national association of contractors having a labor relations service available to its members and chapters.

Highway Material Costs

Another major element of highway costs is materials. During the past year contractors were faced with the difficulty that prices for materials were not established until deliveries were made. And more costly to the contractor than the possible resulting increase was delivery-time uncertainty, making it impossible to schedule operations most efficiently.

There also was little competition among purchasers for materials, and little among sellers because of scarcities.

It is anticipated that the increased rate of production of most materials will continue, and will ease the situation. Until then, the contractor is not able to exercise fully one of his principal functions of being an economical purchasing agent.

Equipment in Construction

I have always been an advocate of mechanization to the highest degree possible in construction operations. One of the methods by which contractors can cut highway construction costs is through the use of machinery which increases the productivity of workmen.

Much of the equipment being used now is war weary, worn, and subject to more than the ordinary number of breakdowns. Manufacturers expect 1947 to be a fairly good production year, but that the majority of contracting organizations will not have fully renewed equipment until conditions improve.

During the past year, the AGC formed a joint cooperative committee with the Associated Equipment Distributors to study mutual problems. We have been informed that distributors are concentrating on keeping bigger stocks of parts and adequate trained personnel to perform increasingly better service on machines in the field.

Costs of equipment have been increasing, and I think it reasonable to assume that equipment will be more expensive in the future. However, there is no doubt that present labor conditions will have a tendency under the competitive contract system to bring about further mechanization. Better equipment will be developed, equipment designed to do more kinds of work more efficiently, and at lower unit costs.

I believe that highway departments interested in securing the best prices in the future should make a careful study of new equipment and the methods made possibly by it, so that maximum advantage can be taken of improved methods in design and specifications.

Contractors must continue efforts to further mechanize their operations.

What Can Be Done About Costs?

As highway officials, you are naturally bending every effort toward solving the cost problem.

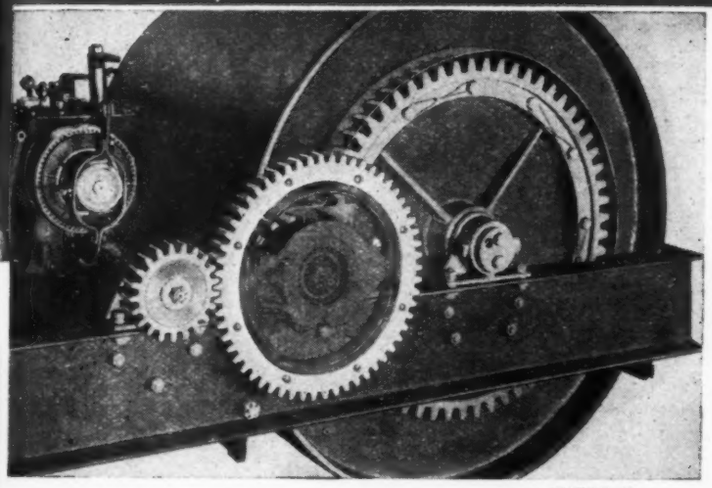
One suggestion I have is that you

(*Continued on page* 70)

Mail Inserted Card or Inquiry Blank (page 129) for Equipment Data

Again this issue of Roads and Streets carries descriptions of many new labor-saving efficiency devices and latest material developments. See our New Equipment and Materials Section beginning on page 109, for which a numbered reply card has been inserted to help you request data on items that interest you. Also on page 129 is an inquiry blank and advertisers' index which will help you get data on equipment and materials you need.

GALION TANDEM *With* SPUR GEAR DRIVE



This high-quality double-reduction final drive construction is more costly--but well worth it, because all gears are machine-cut alloy steel-accurate and durable. All gears are protected from dirt and grit.

Three sizes--with a variable weight range from 5 to 14 tons.

OUTSTANDING FEATURES

- Good visibility of work
- Simple operating controls
- Hydraulic steering
- Large diameter rolls
- Heavy-duty roller bearings at all vital points
- Multiple plate clutches for positive action, long life, velvet-smooth operation
- Extra rugged construction throughout
- Powerful engine--gasoline or Diesel

See your nearest GALION Distributor for complete information on this Variable Weight Tandem Roller.

THE GALION IRON WORKS & MFG. CO.
General and Export Sales Offices
GALION, OHIO, U. S. A.

GALION IRON WORKS

hydraulic GRADERS · ROLLERS

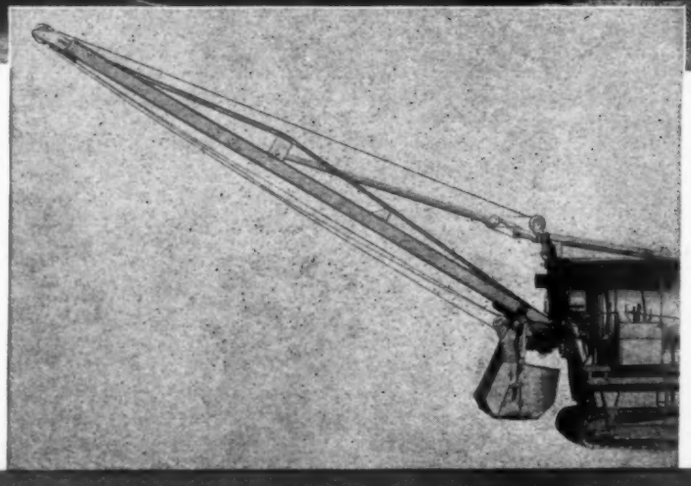
RECENT IMPROVEMENTS KEEP KOEHRING *twinbatch* OUT IN FRONT

To maintain leadership, you just can't sit back and say: "This is so good, we don't have to improve it further." Since we brought out the Koehring 34-E ***twinbatch*** Paver, we have made many major improvements, two of them just recently.

New low water tank reduces overhead clearance to 12'-2". You can now ship the ***twinbatch*** Paver without dismantling anything. You can now pave under low bridges and overpasses as easily as in the clear.

New optional elevating boom opens up a whole new field of application for the Koehring ***twinbatch*** Paver. With the elevating boom, you can now pour walls, foundations, footings, abutments, in addition to paving. Contact your Koehring dealer today for more ***twinbatch*** Paver information.

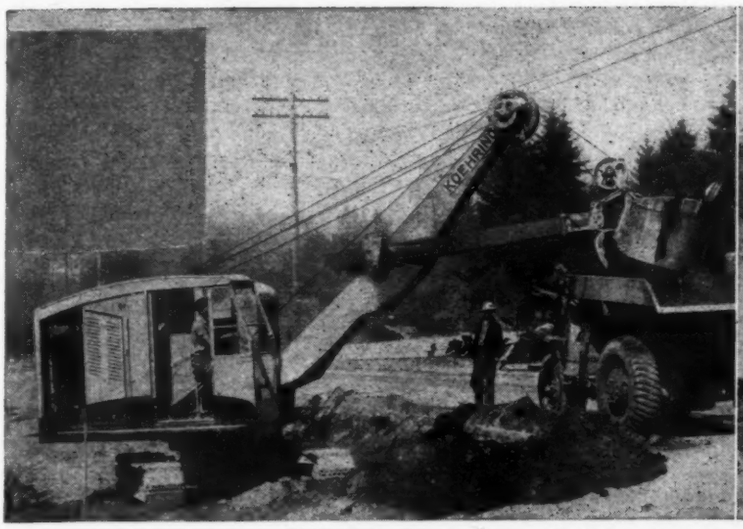
New low water tank reduces overhead clearance to 12'2". Now ***twinbatch*** Paver can pave under low bridges and overpasses, can be shipped from job to job without dismantling anything.



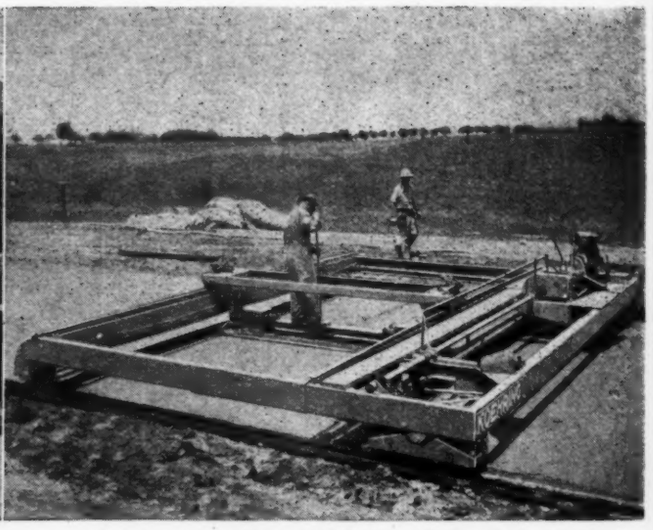
New optional elevating boom. More jobs, in addition to paving, on which you can put ***twinbatch*** Paver high volume concrete production to work, profitably.

KOEHRING HEAVY DUTY

KOEHRING CO. MILWAUKEE 10 WISCONSIN



Grading costs less with Koehring excavating and hauling equipment. Koehring shovels come in a full range of sizes from ½-yard up. Koehring Dumptor, built to work with shovels, dumps 6-yard load in 1 second.



Koehring Longitudinal Finisher finishes slab mechanically, exact to specifications. Keeps up with any paver pace. Always finishes at the RIGHT TIME. Cuts finishing costs to the bone.

PARSONS 250 TRENCHLINER*

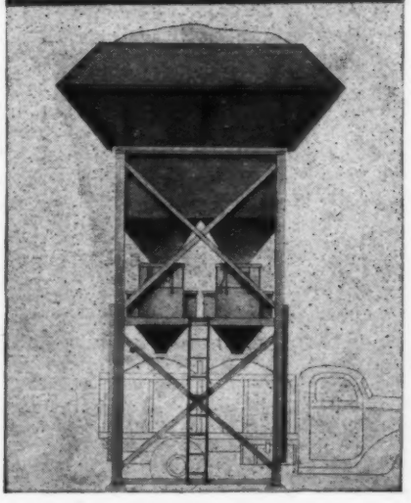
Straight, Clean Trenches for Sewers, Pipe, Water Mains

Parsons 250 Trenchliner, product of more than 40 years of trencher building experience, incorporates all the desirable features that make money for you on trenching jobs. Telescoping boom for easy depth adjustment. Shifts from side to side across full Trenchliner width. Centralized 1-man controls.

*Reg. Trademark

PARSONS CO.
NEWTON, IOWA

JOHNSON DUAL AGGREGATE PLANT

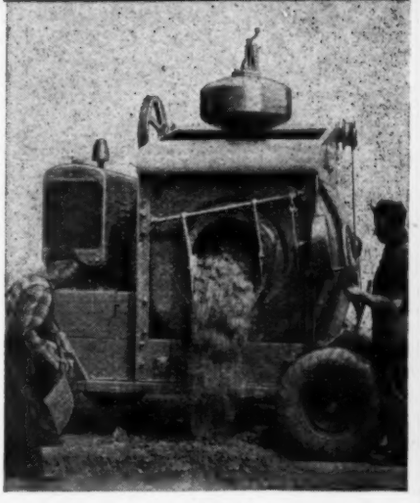


One-Stop Loading for Two-Batch Trucks Saves Trucks

With the Johnson Dual Aggregate Batching Plant, you spot batch trucks just once for a two-batch load. Both batches are discharged simultaneously. Extra spot stops are eliminated. On most jobs, number of hauling units needed to keep paver going, can be materially reduced.

C. S. JOHNSON CO.
CHAMPAIGN, ILLINOIS

KWIK-MIX DANDIE CONCRETE MIXER



Tilted Flow-Line Discharge Chute Empties Drum Seconds Faster

Tilted Flow-Line Discharge Chute, exclusive on the Kwik-Mix Dandie line of concrete mixers, reaches deeper into the drum, intercepts tumbling concrete at just the right angle to maintain natural flow-line in discharge. Kwik-Mix Dandie mixers are available in the following sizes: 3½-S, 6-S, 11-S, 16-S.

KWIK-MIX CO.
PORT WASHINGTON, WIS.

(*Continued from page* 66)

consult with the AGC chapter of highway contractors in your state, because you have mutual interests in this matter. I suggest this also because of the success of the Joint Cooperative Committee of the AASHO and the AGC.

There are a number of things which highway officials can do to help reduce costs without seriously impairing the soundness of highway construction. Out of the meetings of the Joint Cooperative Committee have come these suggestions:

1. **Eliminate hand labor items** as much as possible such as hand rubbing of concrete, fine grading, slope rounding.

2. **Develop tolerances** which will encourage maximum mechanization in grading, paving, etc.

3. **Reduce compaction requirements,** such as permitting deeper "lifts" on fills, where feasible, particularly on secondary roads. This is probably justified by use of modern equipment which is heavier than that formerly used.

4. **Restudy earth compaction requirements** with a view toward permitting greater tolerance in moisture content and material specifications.

5. **Design concrete structures** so as to permit the use of standard forms, thus saving labor and lumber. Research indicates that longer life in reinforced concrete structures results from larger sized members. This also reduces the cost per cubic yard.

6. **Use pipe culverts instead of box culverts** where possible until the present situation eases. In areas of light rainfall, "dips" can be used temporarily.

7. **Lengthen the working season** by every device possible in plans, specifications, timing of lettings, etc.

8. **Set up projects** which can be completed within one season.

9. **Enforce** any substantial changes in requirements. In some localities where changes have been made, contractors report that the hoped for cost decrease did not materialize, due to failure to get word down the line from the top officials, or over enthusiasm for refinements on the part of field engineers and inspectors.

Our AGC highway contractor groups are open and anxious to receive suggestions from highway engineers on how they may cut their own costs and keep down their bid prices.

Higher Pay for Engineers

We realize the difficulties being encountered by a lack of sufficient engineering personnel generally to adequately supervise large programs.

The Joint Cooperative Committee recently recommended that steps be taken to adjust salaries of highway engineers. The failure of many states to increase such pay was held as detrimental to the conduct and progress of the highway program.

Failure of engineers discharged from the services to return to former highway department jobs was reported as delaying output of needed highway plans, and field supervision of construction operations was held "bound to suffer," resulting in aggravated problems for both engineers

(*Continued on page* 92)

Officers and Directors of AED for 1947

★ New Associated Equipment Distributors officers and directors are shown following their installation at the 28th Annual Convention, Edgewater Beach Hotel, Chicago, Ill., Feb. 15.

Front row: H. L. Burleson, Browning-Ferris Machinery Co., Dallas (v.p. and dir. Region 10); William A. Danner, Parker, Danner Co., Hyde Park, Mass. (president and dir. Region 1); A. F. Garlinghouse, Garlinghouse Brothers, Los Angeles (exec. v.p. and dir. Region 11); C. F. Halladay, Halladay-Dettman Co., Sioux Falls, S. Dak. (v.p. and dir. Region 8).

Second row: Maxwell J. Lyons, Lyons Machinery Co., Little Rock (dir. Region 13); Eldon M. Farnum, Allied Construction Equipment Co., St. Louis (treasurer); C. F. Winchester (exec. secretary, Washington, D. C.); Harry J. Hush, Griffin Equipment Corp., New York, N. Y. (dir. Region 2); Fred M. Viles, Fred M. Viles & Co., Spokane, Wash. (dir. Region 12).

Third row: James W. Bell, James W. Bell Co., Cedar Rapids, Iowa (dir. Region 9); J. Walker Wilson, J. Walker Wilson Machinery Co., Youngstown, Ohio (dir. Region 6); Edward J. Crosby, Hedge & Mattheis Co., Boston (dir. Region 1); George W. Swart, Contractors Machinery Co., Grand Rapids, Mich. (dir. Region 7); R. L. Arnold, Arnold Machinery Co., Inc., Salt Lake City, Utah (dir. Region 14).

Not present were Vincent J. Sheridan, Sheridan Equipment Co., Ltd., Toronto, Ont. (v.p. and dir. Region 15); George N. Crawford, G. N. Crawford Equipment Co., Pittsburgh (dir. Region 3); A. E. Finley, North Carolina Equipment Co., Raleigh (dir. Region 4); L. J. Moore, Tri-State, Inc., Atlanta, Ga. (dir. Region 5).

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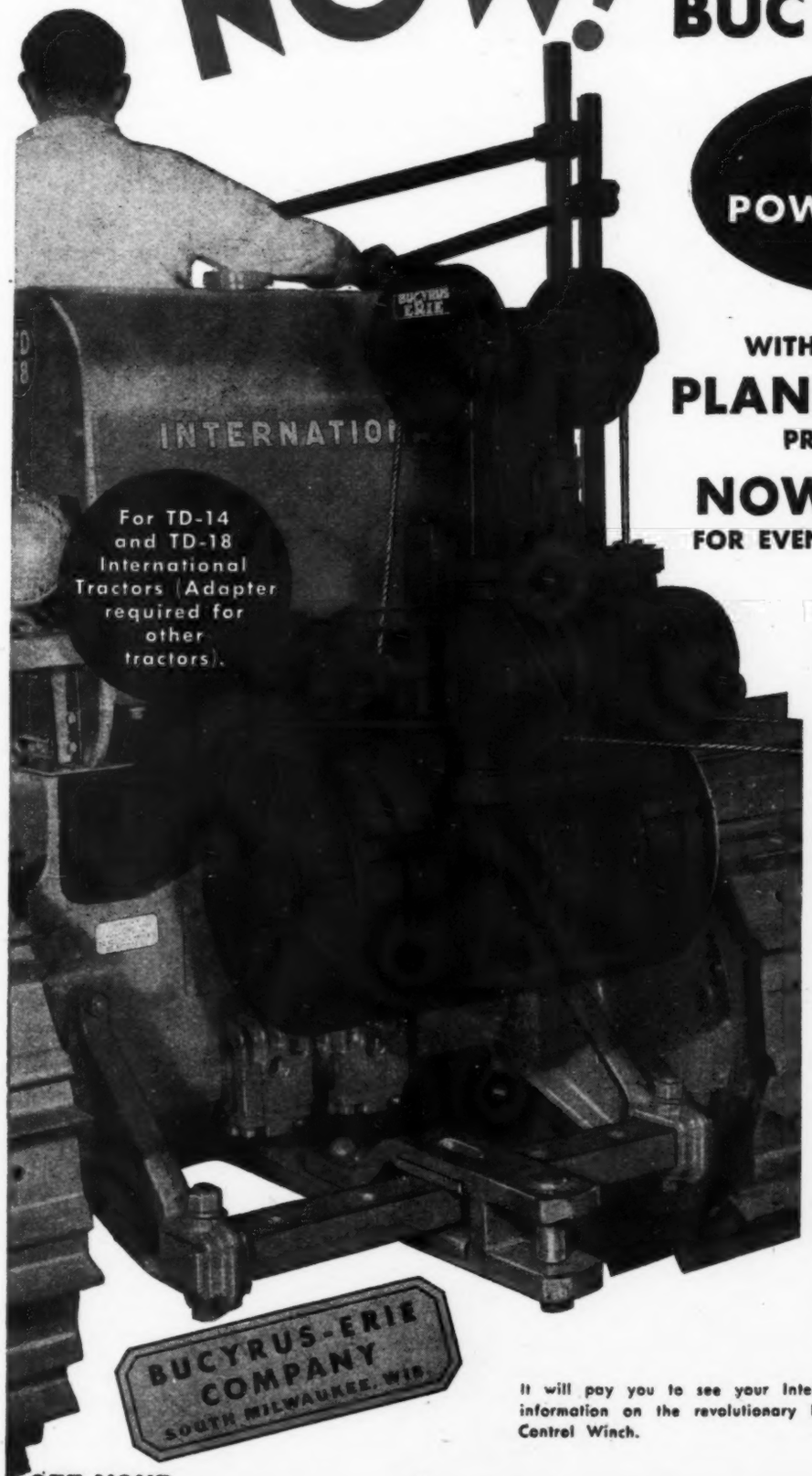

"Cushioned" Clutch and brake action with big drums and bands. Eliminates sudden jerks and shocks. Saves rope, tractor and equipment. Cuts lost time.

External type drums and bands lick the heat problem before it starts. Bands ventilate naturally, cool rapidly, last longer . . . are easily accessible.

Interchangeable, reversible bands. Same bands fit all four drums. Reversible for extra wear. Simple, single-point band adjustment.

Swinging fairleads, large-diameter sheaves, long lead angle — all lengthen cable life, save time and money.

Non-slip wedge and socket cable anchor is accessible, easy to set, safe.

Oil-level sight, convenient oil fill and single, oil-bath lubrication assure simplified, positive lubrication for sustained efficient performance.

Anti-friction bearings. All rotating parts are mounted on anti-friction bearings for extra smoothness and durability.

Single-lever control of brake and clutch means easy handling, positive action, smooth operation. Automatic interlocking prevents dropping load. "Free" position for reeving up, installing new cable. Adjustable levers held rigidly by wide spaced double bearings.

It will pay you to see your International tractor distributor for complete information on the revolutionary Bucyrus-Erie P-25 Planetary Drive Power Control Winch.

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SEE YOUR

INTERNATIONAL INDUSTRIAL TRACTOR DISTRIBUTOR

Curing Slides with Drainage Tunnels

$25,000 being spent on one location area in Oregon. Elaborate contour maps plotted for large unstable areas, as basis for checking progressive subsidence and planning solution

WHEN a sudden large slide occurs the highway department can make headlines by getting in with a battery of shovels and repairing the damage. But it's different where the ground is merely creeping—a headache to the engineers, without any glory. A case in point is the situation in Oregon, where slides constitute a serious problem. Costing an average of $250,000 annually for slide repair or control, the program of the state highway department is chiefly one of prevention or stoppage before serious damage occurs.

Over the years the Oregon state highway department has tried all methods. For major hillside areas of movement or instability it has developed a well defined method of diagnosis and cure which is applicable in many cases. The procedure is to install a drainage tunnel after thorough exploration to determine the plane of slippage. Sometimes this is delayed to see whether the ground has reached a state of stability, the roadway and shoulders meanwhile being restored to grade and alignment.

★ Scene of a large progressive slide. Note left jog in centerline denoting lateral movement since the fill was last regraded

Platting Details

When it is decided to perform a major operation on a slope, the first step is to take levels and plat a contour map to a scale usually of 50 ft. per in. Levels are taken on a grid of points 20 ft. in each direction. Paths of surface breaks are drawn in, along with the roadway and right-of-way lines and other significant details, such as parallel rail lines, buildings, etc. On this map, also, are eventually spotted the location and depth of test pits to be dug, the elevations of the ground water and slippage plane as found in each pit, and the proposed location of drainage, lines or tunnels considered desirable.

Test Pits Lined

Without waiting for this plat to be completed, one of the state's three test pit and tunnel crews goes to work. Under the direction of a foreman who has had long experience in this work, the men proceed to put down pits, using a simple bucket and hand winch. Pits are usually made 4 ft. square, or 4 x 6 ft. All pits are lined and pumped as work progresses, being a standard lining consisting of 2 x 12 in. lumber with keyed or dovetailed corners. Boards are spaced about 1 in. apart, to anticipate swell and allow infiltration.

As the digging goes down the material is watched and a record made of its character, depths of various strata, etc. The men especially watch for the telltale signs of the thing they are digging for: the slip plane, which is usually well defined. Slippage of deep masses of earth and rock create great friction and shearing stress under the pressure of the over-burden, and visual inspection will usually show when the plane has been reached. Stone, shale and even clay will often have a laminated, twisted appearance which experienced men can quickly recognize.

The number of test pits varies with each slide area, and may range from

★ Pick-up truck used by the tunnel crew, which is shown here loading a pump after completion of several test pits

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★ ★ ★

CHRYSLER INDUSTRIAL ENGINES give *maximum earning power* and *longer life* to many types of powered industrial equipment. Superbly designed, engineered and built – with flexible horsepower – Superfinished parts – accessibility for servicing and nation-wide parts availability, they are winning *wide acceptance* among industrial power users. Write the factory for complete details or mail the coupon for catalog.

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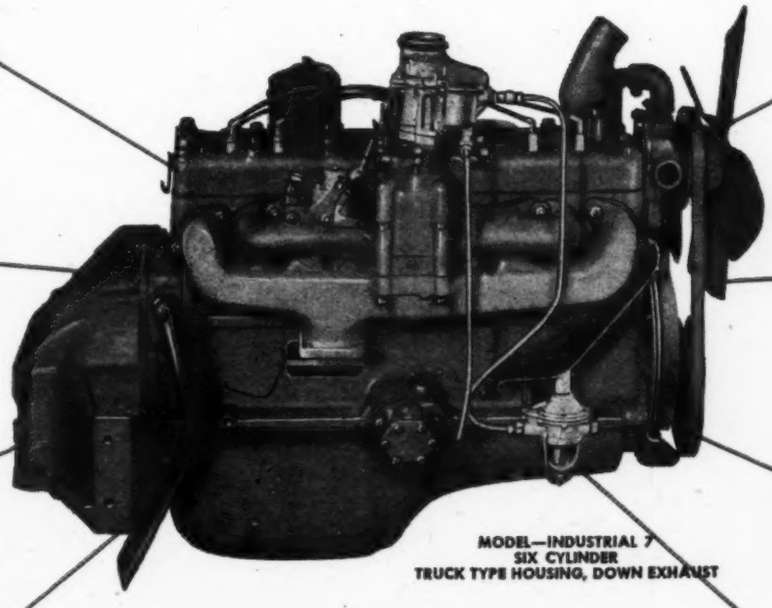

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SIX CYLINDER
TRUCK TYPE HOUSING, DOWN EXHAUST

SOME IMPORTANT FEATURES: By-pass Thermostat Control. Heavy-duty Air Cleaners. Electric Starter. Standard Battery Ignition. Shunt Wound Generator with Full Voltage Control. Double Bearing Water Pump with Packingless Type Seal. Available with S.A.E. Type Housing. Portability—Low Weight per H.P. Rotor Type Oil Pump. Removable Cartridge Type Oil Filter. Heavy Duty Dust-proof Distributor. Superfinished Parts.

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★ (Left): Another slide area. Arrows show location of two of several test pits, these pits having been dug and lined to a depth of 65 ft. (Right): Pits are 4 x 4 or 4 x 6 ft. inside the timber lining. Pits are covered after completion to prevent persons falling in

three or four to several times that number. Slip planes are usually found on top of rock or other relatively hard stratum, and having sufficient elevations from the pits, the general contour of the slip plane can be plotted.

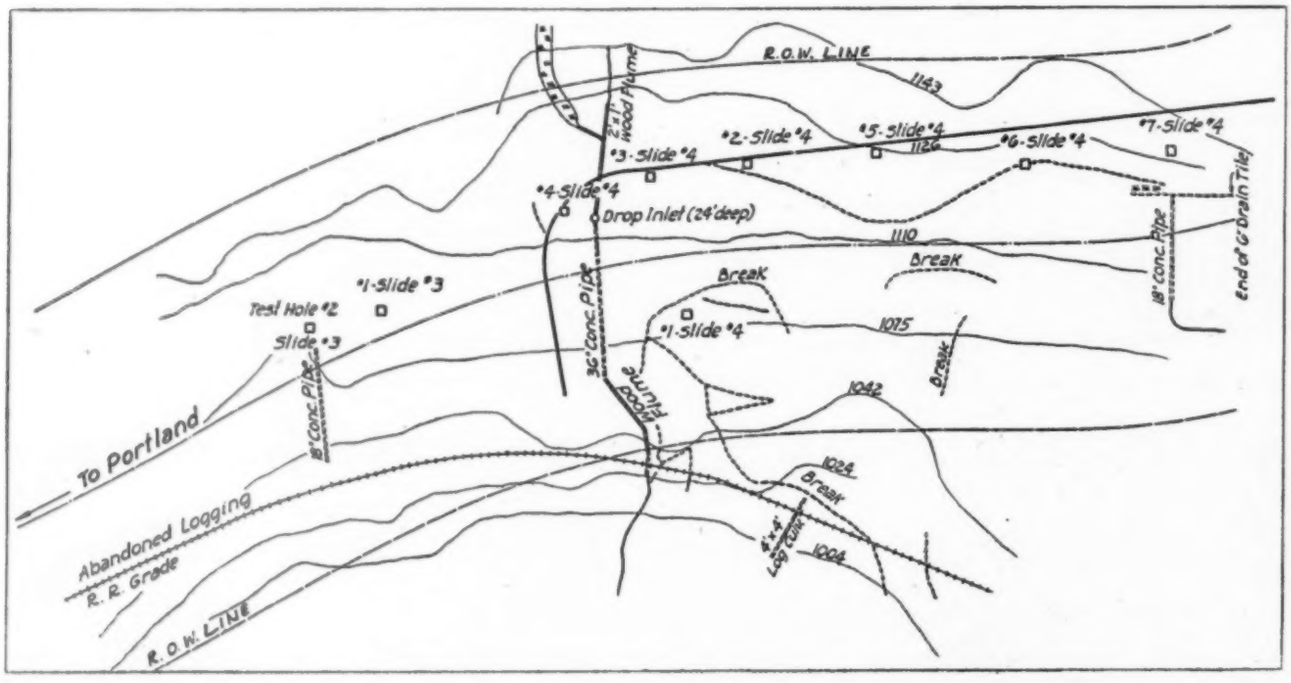
The next step is to locate and excavate the drainage tunnel. In a typical case the tunnel goes into the hill just outside of the moving area, then turns and traverses the area parallel to the road. Tunnels are usually rock jobs, being located at a grade and elevation designed to keep the roof just below the slip lane. A minimum of 3% grade is desired. The standard tunnel is timber lined, 4 ft. wide by 6 ft. high, and excavation is by usual hand methods.

Then comes the final operation, which is simply to bore 4-in. auger holes down through the slipping mass at intervals, puncturing the roof of the tunnel. The holes are not encased, but allowed to close partially, still serving as effective weep holes. Experience shows that this form of drainage speedily reduces the water table and in most cases stabilizes the ground against further slippage. The site is of course watched as time goes by, and eventually it may be necessary to install perforated corrugated iron pipe in the tunnels and fill them with large stones if and when the timbers show signs of rotting out.

Pits Down 70 Ft.

Test pits may go down as much as 65 or 70 ft. or more, as is the case on a large slide job currently in progress on the Wilson River Highway. Tunnels up to a thousand feet in length have been found necessary and economically feasible. Tunnels cost about $25 per running foot. Of several slide corrections in progress late in 1946 on the Wilson River Highway one alone will cost about $25,000 the area (see accompanying plat) being a quite extensive one, extending some 800 ft. along the road. This hillside has given trouble for 5 years, and it has been repeatedly necessary to build up the grade, reset guard posts and repave. The $25,000 bill for stopping the trouble with some degree of permanency is cheap considering the annual cost of ten to fifteen thousand dollars required to keep patching the progressive damage, not to speak of the danger and inconvenience to traffic on this very important highway between Portland and the coast.

Building up subsiding road fills to bring them back to grade usually only aggravates the slide condition. Sliding is of course due to a variety of



★ Topographical map of slide area on Wilson River Highway, Oregon, showing location of surface breaks, test holes, drain lines and drainage tunnel with respect to the highway

"THE SIGN OF EXTRA SERVICE"

It sure gave us a lift!

There's more than one way to load out trucks, but I never saw one that could beat this. We thought we used to do pretty well until our Oliver "Cletrac" dealer happened to drop in one day.

"Look," he said, "you're doing a good job of dirt moving, but here's a way to give the job a real lift. Put a new Drott Hi-Lift shovel on those Cletrac's of yours and watch the dirt fly. You see, this unit strips, scoops, carries, and dumps the dirt into your trucks. The deep shovel gets a full load every time . . . doesn't spill. It's pivoted so you can't help but get a bigger load and that means faster, more economical operation.

His suggestion gave our production a real lift. The Oliver "Cletrac" dealer sure knows his business and is a big help in ours.

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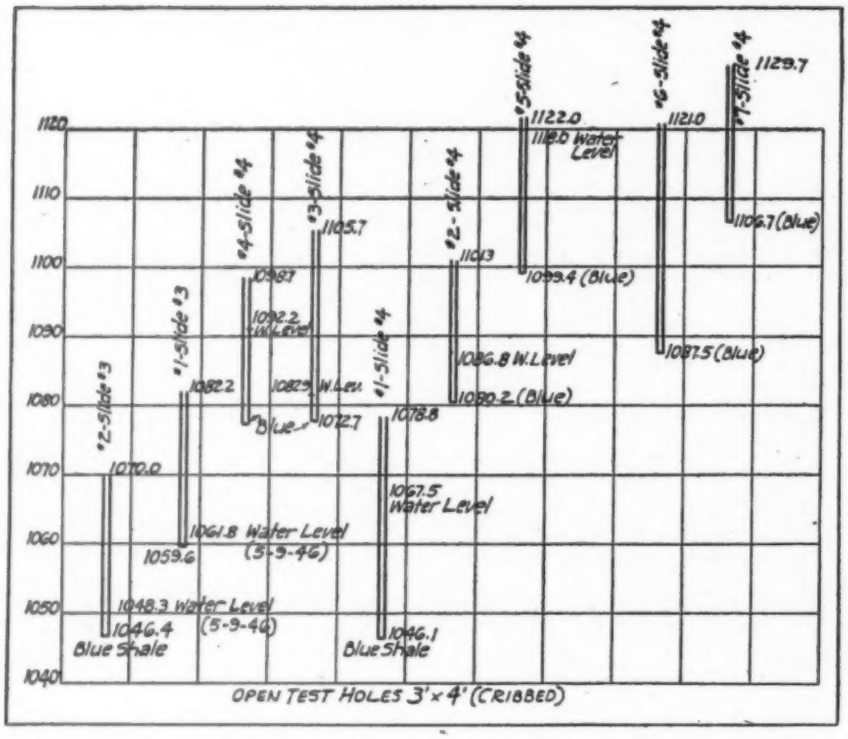


★ Hillside cross-section showing location, elevation and depth of test holes

conditions. The burden of a fill across the lower part of a hillside of loose talus, as is the situation on the Wilson River project mentioned, serves to compress the underlying soil, clog or disrupt natural seepage and dam up the ground water above the roadway. A slope that previously was stable then becomes a slowly screeping mass. Drainage is the only cure. It is hoped to stabilize several locations along this highway in the current program.

$150,000 Slide Along Columbia River

Some very large and sudden slides have also occurred, one of the most recent being the 350,000-cu. yd. slide on the scenic Columbia River Highway, which early in 1946 took out the road and a bridge, sweeping a section of parallel rail line also into the river. This slide cost the highway department and the railroad a combined $150,000 for immediate repairs. Three shovels and twenty tractors worked for three weeks to restore traffic. The steep 500-ft. slope at this point is still a point of danger and the highway department is cutting it down with a dragline and collecting seepage in a temporary corrugated pipe, pending decision as to the best method of getting the hill permanently drained and stabilized.

Slide control is carried out under the maintenance department of the Oregon highway commission, E. A. Collier, maintenance engineer. R. H. Baldock, state highway engineer, has always taken a special interest in this work. The Wilson River road projects aforementioned are under the Portland Division, W. C. Williams, division engineer.

•

Geo. Washington Bridge to Have More Lights

George Washington Bridge, Fort Lee, to the Passaic River at Paterson, is to have continuous lighting, according to state department plans. Increased illumination will necessitate 438 lamps. This will require 204 new units, 193 of 4,000 lumens and 11 of 6,000 lumens, in addition to the restoration of 76 lamps taken out of service during the war-time driving curtailment. The spacing of 400 ft. between poles will be reduced to 175 ft.

The design was submitted by James L. Hays, electrical engineer, and details on the scene surveys were made by William B. Widmann, electrical field assistant, in night and day studies.

The great increase in automobile commutation over the George Washington Bridge and the extensive home development at and adjacent to Fairlawn, Bergen County, has taxed Route 4 capacity.

Several fatalities have resulted from smash-ups in this area.

Safety Tips

A recent publication of the National Safety Council in connection with Accidents in the Construction Industry, gave the following main causes of Accidents involving equipment:

1. Oiling, adjusting, and repairing without stopping machines or blocking equipment.
2. Failure to stand clear of moving equipment.
3. Failure of workers to give adequate signals or warning when moving loads or machines.
4. Unguarded gears, sheaves and fans.
5. Defective parts.

If these hazards are watched closely you will improve your record materially.

•

323 "Time Lost" Accidents Among Pennsy. Road Employees

The Pennsylvania Department of Highways reports 323 lost time accidents during 1946 by employees; this compares with 199, 170 and 403 in 1945, 1944 and 1941, respectively.

The accident frequency rate per million man hours last year was 10.51, compared with 8.36, 7.56, 10.72 in the previous years.

Nearly half the accidents last year were in "over 50" age group.

Only eight counties did not report lost time accidents during 1946. One maintenance office (Philadelphia) has not had recorded a lost-time accident in 7 years.

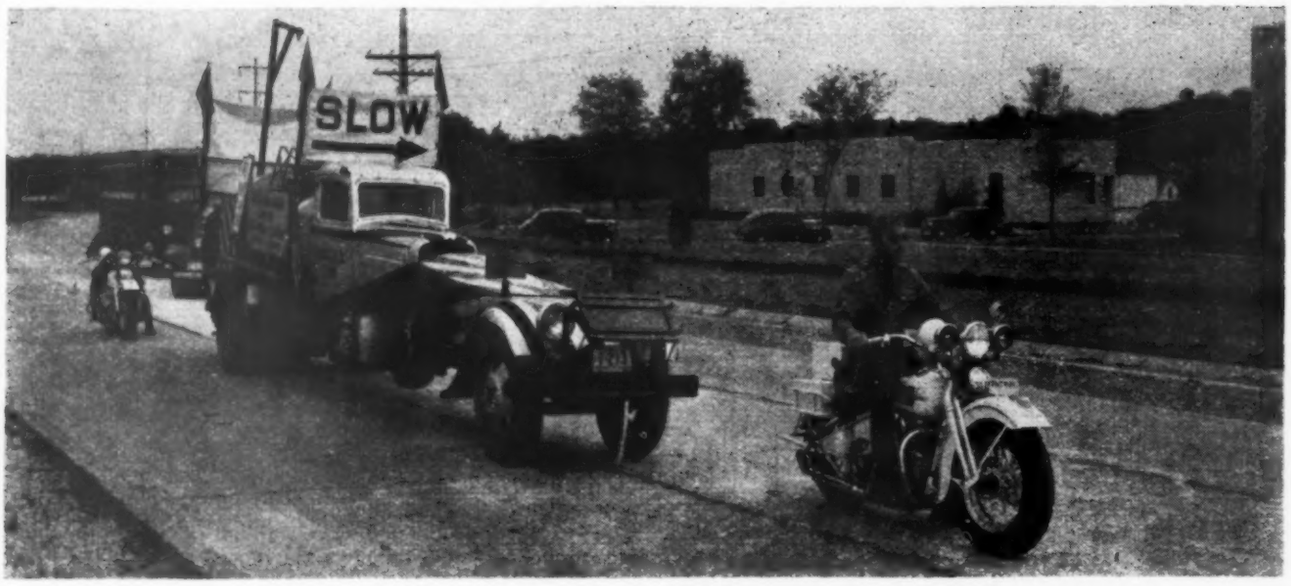
Eight department employees were killed as a result of accidents last year. That is the same number as in 1945. In 1944 the number of department workers to lose their lives was only three.

•

State Plans 900 Miles Force Account Construction

The Pennsylvania Department of Highways has authorized a $6,234,020 program of rural road improvements to be undertaken this season by its own forces; 459 miles of highway are involved; $4,183,000 worth of such road improvements authorized late last year, but held over, will bring the total 1947 force-account program to 900 miles.

The 459 miles just announced will include 149 miles of macadam, estimated at $4,140,000, and 310 miles of stabilized "Farm to Market" roads, at $2,093,720.



★ Missouri's striping outfit is believed to have the speed record. It makes a hundred miles a day under favorable circumstances—covers the state system in a season with time to spare

Pavement Striping Methods

Wide variety of special equipment still employed by state highway departments; use of reflector beads growing; paint shortage being gradually overcome

EFFORTS to renew and modernize pavement markings since V-J Day have been retarded by a paint shortage, note highway department maintenance engineers. Paint requirements for arterial highways run into millions of gallons annually. The shortage while spotty has been real. T. H. Dennis of California points out that the main shortage during 1946 was in pigments. From Colorado A. R. Pepper writes typically, "For the first time in many years we have accepted stock materials from manufacturers as well as specification paint. Wartime specifications, which surprisingly enough proved equal if not better than prewar, had to be modified due to the continued shortage of key ingredients . . . we have encountered difficulty in obtaining enough paint to carry on a concentrated program, and certainly not enough for a desirable program."

Mississippi has "been unable to get any paint at all for the past two months," quoting maintenance engineer F. J. Russell. "Shipments small and striping program considerably delayed," says Missouri. Nebraska was able to get half its needed supply, according to M. A. Butcher. From New Jersey, Alex W. Muir sums up by saying, "We have been forced to use most anything we can get, regardless of price and almost without regard to quality . . . Not a single bid on 25,000 gal. to our specifications."

On the other hand some states haven't fared badly at all. North Dakota has a large prewar paint stock, reports Ray Robinson, and will resume striping in 1947. Montana and Nevada report no difficulty in supply. Traffic engineer Edgar F. Copell of Massachusetts reports no trouble in getting paint for a program somewhat below the normal 25,000-gal. season's run.

Texas sidestepped the paint shortage by its policy of striping with ordinary sealing asphalt. Virginia has doubled its ordinary paint program after increasing its 1946 paint order from a normal 80,000 to 165,000 gal. One supplier this year delivered 125,000 gal., reports W. W. McClevy, purchasing agent. Washington striped primary and secondary roads last year in a nearly 100% program, reports J. H. Marshall.

Idaho purchased 20,000 gal. of yellow paint in 1946. Five bidders quoted from $1.43 to $2.70 per gal., quality being direct ratio to price. Prewar cost for superior paint, $1.25 to $1.35. White paint only was used in 1944 and 1945, for lack of yellow, and the state went to a 4-in. dash line (20-ft. line, 30-ft. space) to stretch supply.

Versatility means Economy!

Complete Unit: Gar Wood Model CB Crane, Orange Peel Bucket, Hydraulic Hoist and Dump Body, Winch, Controls and Drive Parts. Gar Wood supplies all the equipment necessary for installation on any make truck chassis.

Full Vision: Simple Controls . . . All lines are controlled by two hand levers and a foot treadle. The Power Crane removes and later replaces the Catch Basin Cover.

In the cleaning of catch basins — municipalities everywhere are turning to Gar Wood's newly engineered, specially designed CATCH BASIN UNIT . . . because it does the job better, faster and more economically than the old fashioned hand shovel crew and truck.

Full powered, these compact units take up surprisingly little room . . . only 36" on the chassis frame. A Gar Wood 8' body can be mounted back of the crane on a Standard 160" wheel base truck. Where the question of long hauls is involved and the crane is to be kept in operation for constant loading — it can be mounted on a short wheel base truck without a body. And when the need arises for the use of the crane alone — the bucket itself can be removed.

This versatility has made the GAR WOOD CATCH BASIN CRANE UNIT the most economical purchase in the field.

Crane Lowering Fire Hydrant.

CB Crane handling heavy portable equipment.

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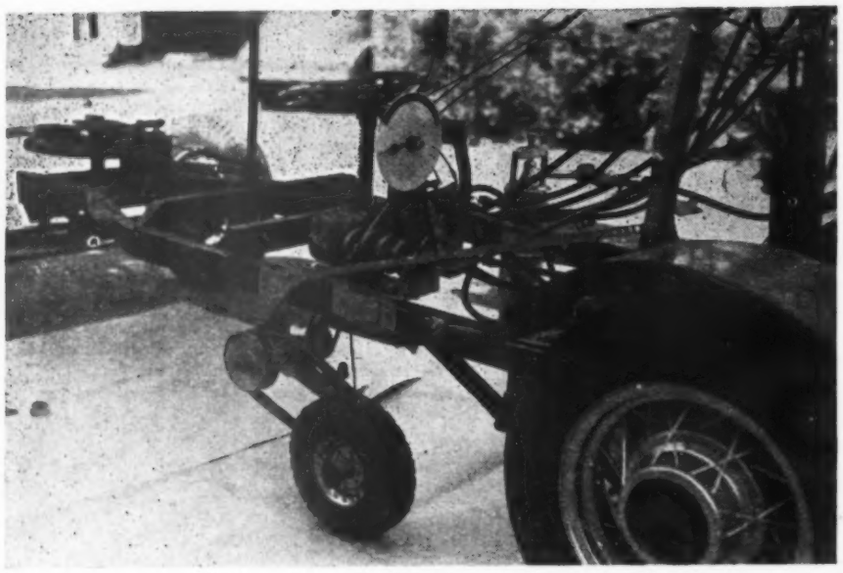


★ Special device on the New York Pushmobile which controls the length of the broken line cycle. This device can be added to any regular spray outfit

★ New York's well known Pushmobile, a shop built unit which was equipped this year with special controls for more accurate painting of broken lines. In 1941 New York State used approximately 100,000 gallons of paint and the cost, including labor and equipment, was about $175,000. Four hundred miles painted in Western New York used approximately 2600 gallons of paint and cost $9.00 per mile, of which the labor and equipment charge was about $3.00 per mile. In the current year, 3200 gallons of paint have been used and the cost was approximately $12.00 per mile

Striping is a relatively costly detail, and should be, considering its importance. We are indebted to Ray Cavendish, state maintenance engineer of West Virginia, for the following data for 1945:

Miles painted	1,424.09
Labor cost	$10,241.79
Equipment cost	3,346.76
Paint and other supply	14,764.97
Total stripe cost	28,353.52
Prelining (1,192 mi.)	6,502.53

The total of $34,856.05 which doesn't include a minor item for several crossings, represents $19.91 per mile for striping and $5.45 for prelining. Paint used was 7.87 gal. per mile of roadway.

Reflector Beads Now Widely Used

More states are now using reflectorizing beads and the practice continues to spread. [See October, 1946, R&S for Michigan practice.] Their advantage is well stated by T. H. Dennis of California, who observes, "We have been using glass beads in the stripe for several years on main highways and in areas of fog. These beads not only increase the visibility of the line for night traffic, but have the advantage of prolonging the life of the stripe for two or three times normal expectancy. Beads are applied with a dispenser placed directly behind the paint spray guns, at the rate of 100 lb. per mile for a solid 4-in. line."

Mississippi's arterials now have the beads, for the solid center stripe and the solid yellow barrier used. Oregon has beaded its solid yellow stripes and its barrier stripes, with definite public appreciation.

Minnesota is experimenting with a new type of both white and yellow paint, in which a part of the filler consists of fine glass beads. This paint can be applied with ordinary painting equipment that will handle conventional paints. After it is put down and starts weathering the beads reflect the light for night driving. Where such lines are subjected to wheel traffic they develop reflecting qualities at a faster rate. States C. L. Motl, "Our purpose in experimenting with this type of paint is in the hopes that we can secure a reflecting type of paint that will be simple to apply, more durable, and that will improve rather than deteriorate with age. Our experience so far indicates favorable results."

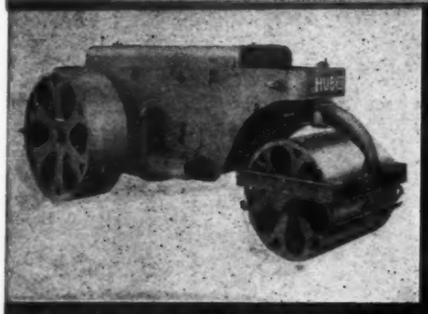
Wide Variety of Striping Equipment

The word "home-made" still best characterizes the various outfits used

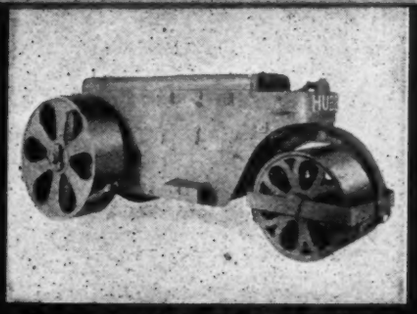
★ How Tennessee does it. Working under protection of a warning sign, a small one-man striping vehicle with air-cooled gasoline motor propulsion lays stripe. The following truck carries paint supply, also flags which are dropped at intervals to keep motorists off the line until paint is dry. Right view shows flags being snatched up from the moving truck

THERE'S MORE TO HUBER ROAD MACHINERY THAN MEETS the EYE

There is Huber's many years of know-how in building dependable, speedy, and long lasting 3-wheel and Tandem Rollers, which has played such a vital part in the outstanding success of the Huber one-man-operated Maintainer. There is Huber's expert knowledge of road machinery application and the needs of the vast road building fraternity. Then there is Huber's network of strategically located Distributors who know the local picture and who augment Huber's sincere desire to serve. All of these are behind every piece of Huber Road Machinery you buy. And that is why you can buy Huber Rollers and Maintainers with confidence.

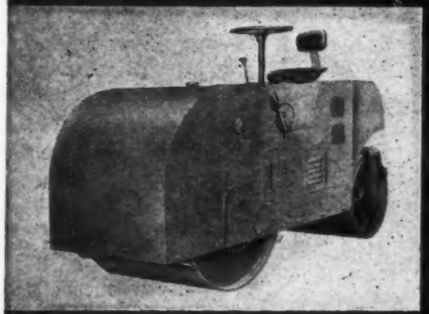


● HUBER 5 and 6 TON — 3 Wheel Roller

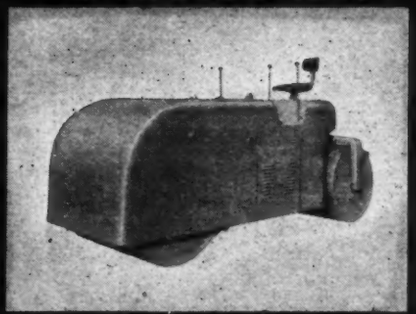


● HUBER 8 TON — 3 Wheel Roller
Also built in 10 - 12 Ton Size

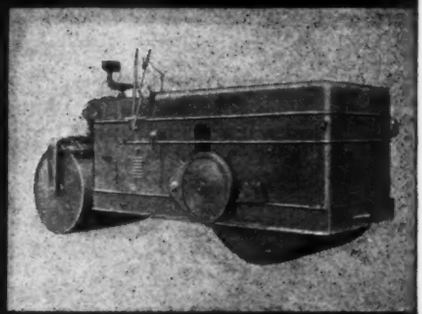
● HUBER — Maintainer



● HUBER 3-4 TON Variable Weight Tandem Roller



● HUBER 5-8 TON Variable Weight Tandem Roller



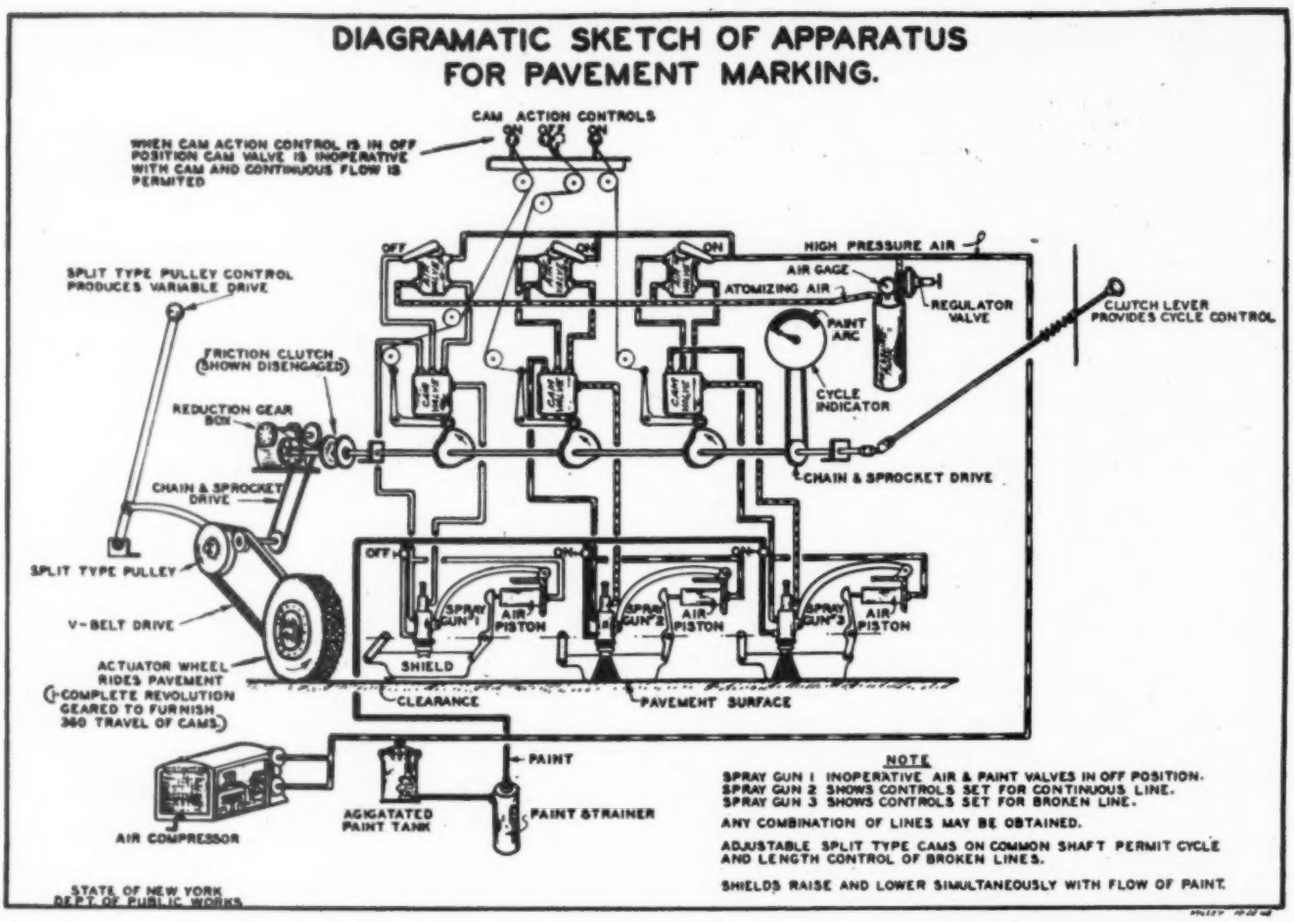
● HUBER 8-12 TON Variable Weight Tandem Roller

THE HUBER MFG. COMPANY ● MARION, OHIO, U. S. A.

HUBER

3 Wheel ● Tandem

ROAD ROLLERS *and* MAINTAINERS



★ Diagrammatic sketch of New York State's apparatus for pavement marking

for striping. Little new equipment such as trucks, pots, push carts, compressors, etc., involved in striping outfits, has been available, and much credit is due state highway maintenance and shop men for making old equipment do and for devising improvements. Improvements are coming along. For example, one Texas district is working on a better paint spray bar. California is modifying and improving its equipment. More detailed accounts of equipment developments in several states are reported, as follows:

New York: (C. R. Waters): "We have installed on our "Pushmobile" stripe machine an apparatus to indicate the beginning of the painting cycle so that we are able to duplicate previously painted lines almost exactly. There has been some discussion that some of the states have not adopted the dash line because of the difficulty of retracing. Our machine contains a variable drive, and hence we are able to vary the length of the dash line. Our entire apparatus is not very costly. Outside of the truck, compressor and paint guns, which are necessary for any method of painting, I would estimate a high present-day figure would be less than $2,000 to build a Pushmobile.

"The Pushmobile is a 4-wheel vehicle on pneumatic tires, which is pushed by a truck carrying paint tanks, air compressor and auxiliary equipment. It has a leading steering wheel, and one man gives his entire attention to steering. A second man operates the valves so as to place the markings on the pavement in accordance with the symbols previously marked by engineers.

"The making of the dash line is automatic, by reason of a cam arrangement which mechanically opens and closes the paint guns at regular intervals. The length of the dash line can be adjusted to agree with previous markings, by means of a variable drive through a "fifth" wheel arrangement which runs on the pavement.

"A simple clutch throws the cams into starting position so that the painting cycle may be started at the proper place. This clutch and variable drive arrangement make it possible to duplicate dash lines previously placed almost exactly.

"Paint tanks on the truck are under air pressure and the paint is mechanically agitated. It is also agitated previous to loading. The paint line carries a large strainer which prevents clots from reaching the guns, and avoids many delays which would otherwise occur. The air used for atomizing the paint is carried at a different pressure than that used for operating the valves. In marking the pavements, the paint is confined by metal plates each side of the guns. There are three paint guns parallel to each other, and any or all of these can be placed in operation as required. The speed of operation is 10 to 15 miles per hour.

"This is not a complicated machine or mechanism, but one easy of operation, and its handling can be learned quickly by any skilled mechanic. There are also, on the market, simple mechanically-operated three-gun machines which, a year or so ago, could be purchased for less than one thousand dollars."

Mr. Waters also explains, "We do not paint in accordance with the method described which states that with three guns the center gun is used for white paint and the two side guns are used for yellow paint. We use the center gun of three guns for painting the center line on bituminous pavements, and at the beginning of the 'No Passing' area we shut

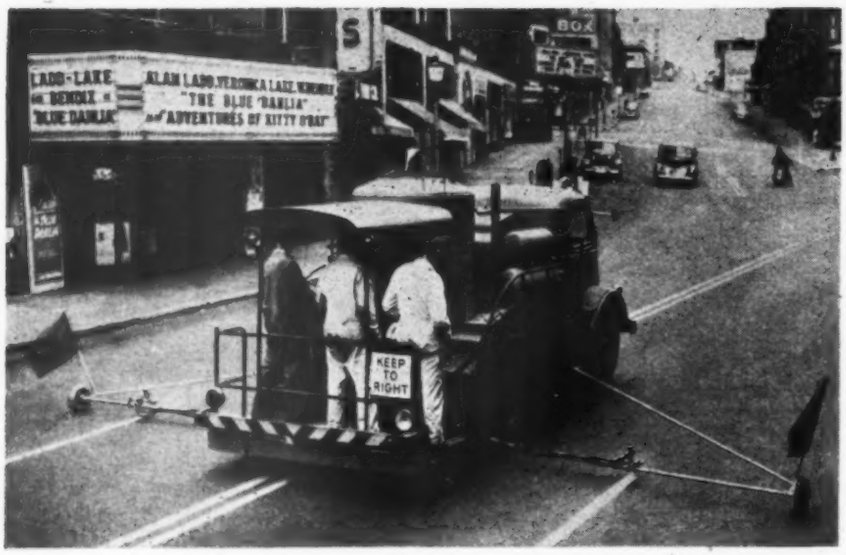


Photo by Acme

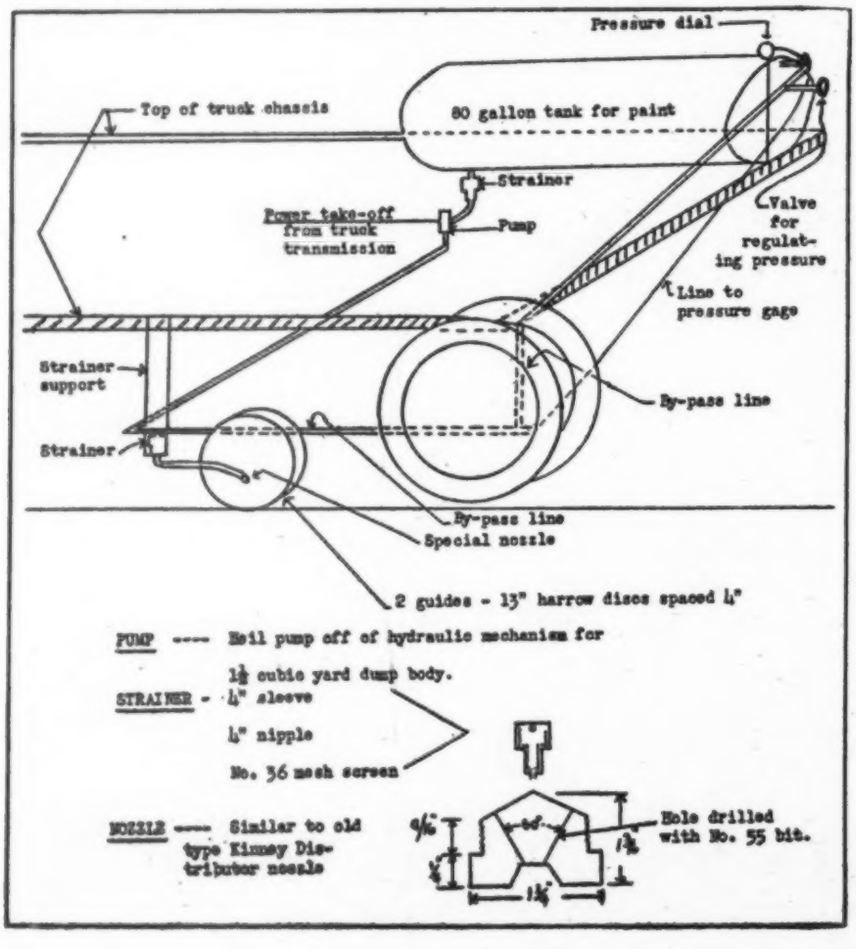
★ Special machine used by Tacoma, Washington, to speed up striping. Designed and built by Carl Schmer, it takes three men to run, makes a block a minute and 25 miles in a day.

off the center gun and use the two outside guns—one painting dash and the other painting solid. On concrete pavements we do not use the center gun because we paint just off the construction joint. We use the outside gun for center line and both outside guns in No Passing areas."

Idaho: New equipment hasn't been available, nor has supplementary equipment such as pick-up, station wagons, etc. Two stripe applicator carts were completely rebuilt in 1946 to permit better operation and permit placing the dash line with reproducible precision. The back axle is a Ford rear end. The differential is connected by shaft and chain drive to a gear box or transmission. This in turn operates through a solenoid which controls the paint application and thus the length of line between breaks. Air curtains (Kelly-Cresswell type) have been installed on one of the units, and will be used on both units in 1947. This type of curtain is considered more satisfactory than the wheel or slide type, particularly on dash line application.

Says C. C. Hallvik of Idaho, "We have not yet found a satisfactory method of spotting the line or guiding the stripe machine, other than the slow, time-consuming method of 'stringing.' Because our program was small during the war and stripe not always properly centered, we have had to string and re-center perhaps 90% of our stripe to get back on the beam."

Mass: "We displaced our old brush-



Gallonage of Paint Used by States to Mark Pavements

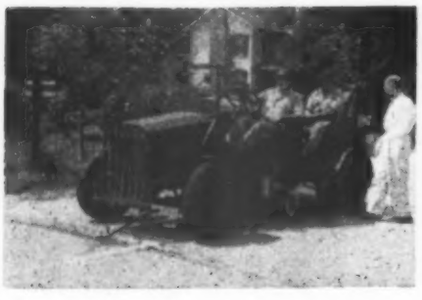
Figures compiled in 1946 by C. R. Waters, District Engineer, New York State Department of Public Works, Buffalo.

State	No. of Gallons
Alabama	25,000 to 30,000
Arizona	30,000
Arkansas	50,000
California	100,000
Colorado	40,000
Connecticut	30,000
Delaware	10,000
Florida	10,000
Georgia	60,000
Idaho	20,000 to 25,000
Illinois	.....
*Indiana	9,800
Iowa	60,000
Kansas	33,500
Kentucky	60,000
Louisiana	.....
Maine	12,000 to 14,000
Maryland	50,000
Massachusetts	25,000
Michigan	30,000
Minnesota	27,000
Mississippi	40,000
Missouri	95,000
Montana	28,000
Nebraska	50,000
Nevada	60,000
New Hampshire	18,000 to 20,000
New Jersey	.....
New Mexico	35,000
New York	100,000
North Carolina	.....
North Dakota	16,000
Ohio	150,000
Oklahoma	4,000
Oregon	50,000
Pennsylvania	120,000
Rhode Island	15,000
South Carolina	30,000
South Dakota	5,000
Tennessee	35,500
**Texas	.....
Utah	40,000
Vermont	8,000
Virginia	105,315
Washington	72,000
West Virginia	11,210
Wisconsin	31,000
Wyoming	15,000 to 20,000
Province of Ontario, Canada	30,000

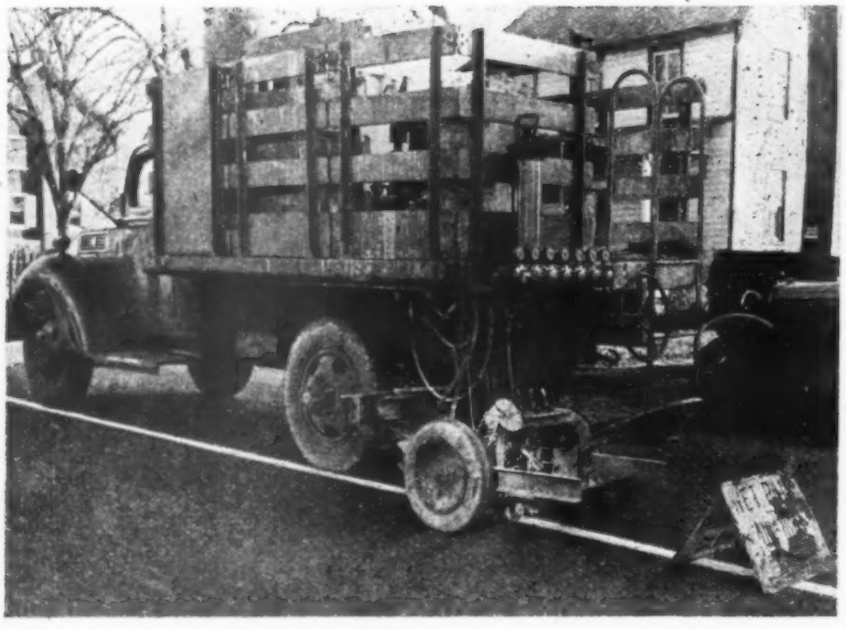
*Use mostly R.C. 3 Asphalt & White Stone Chips.
**Use R.C. Asphalt & Stone Chips.

★ Details of the N. Caroline machine, built by O. K. Stephens, a division supervising foreman

★ Idaho's cab-over-engine striping truck with pusher outfit



★ "Inexpensive and does a good job," is the report on this N. Carolina striping outfit, also home-made



★ Pennsylvania has made efficient use of this rig

★ Utah's pusher type machine in action. This state issued an excellent new sign and pavement marker manual in 1946

type paint machines with motor-driven, hand-guided spray machines a few years ago, cutting our paint time to one-fifth over the old system," reports E. F. Copell. "However, difficulty in protecting paint while drying has prevented realizing the full advantage of speed."

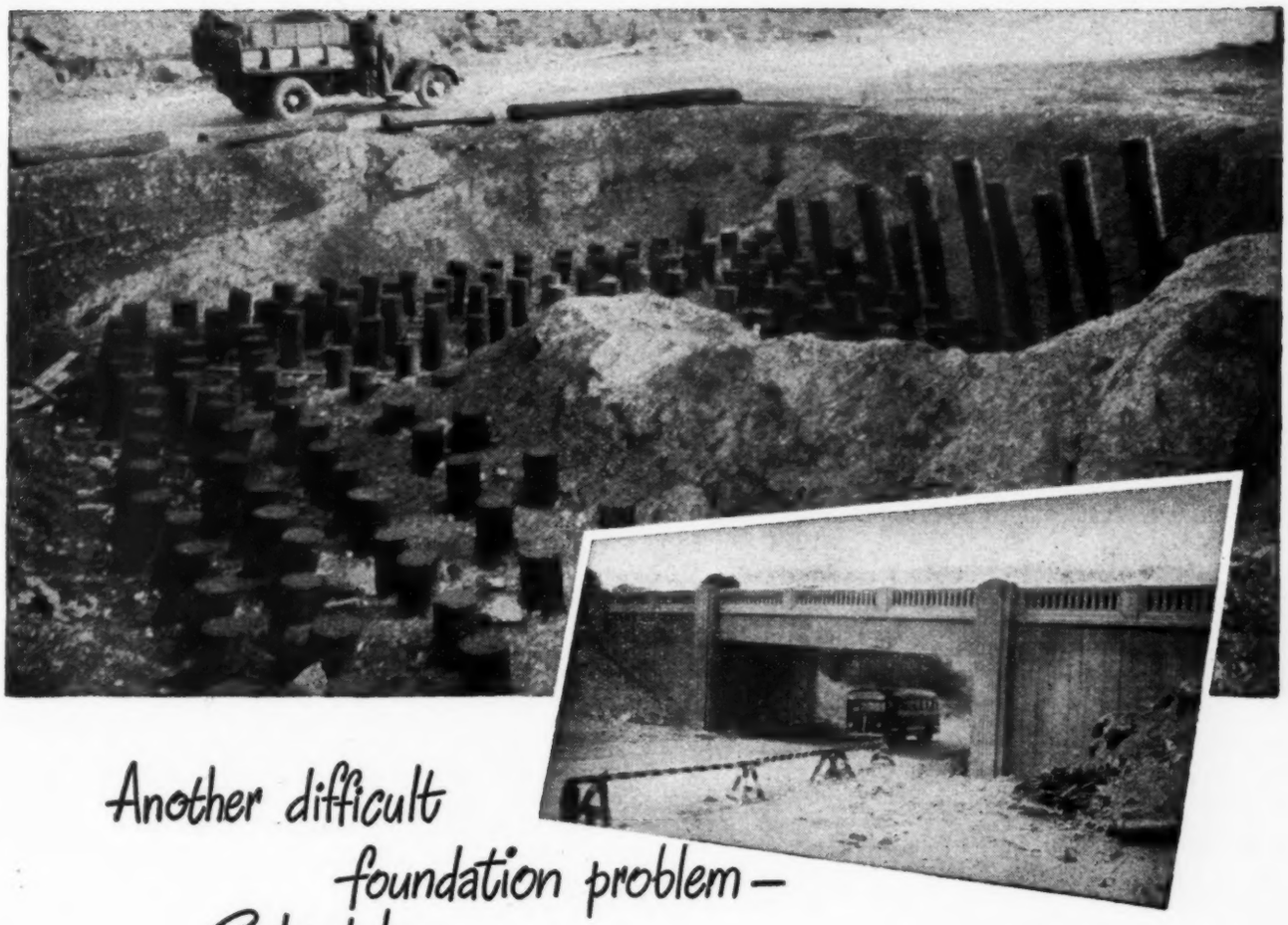
Colo.: A. R. Pepper, traffic engineer, writes: "Our equipment and procedure are the same as for the past six years. We would like to make some changes when materials are again available, especially in the method of paint supply during operation, either by increasing the supply carried or by better 'along the road' distribution.

"The aim is to insure uninterrupted operation. At present our carried supply of 180 gal. white and 60 gal. yellow is only enough for 12 miles of continuous painting."

The Colorado staff expects to speed up the job through development of new methods for preliminary spotting of lines at double the present rate of 5 miles daily. Experimental work has been done on equipment which ties in the laws of physics and vehicle motion with design, in order to fix the natural division determined by a moving vehicle. Use of a transit on tangents and tape on curves is a slow procedure at best, and takes too much of the striping season.

Missouri: "Our equipment is much the same as for the past ten years," reports Rex Whitton. "All black striping on concrete, white striping on asphalt and yellow No Passing lines are placed with a single very efficient machine. This was made up in the shop of the state highway department's bureau of equipment. It covers the entire state each year, placing all stripes, and still has time left over." This unit annually applies 96,000 gal. of paint in the three colors, and has covered as high as 100 miles of 4-in. solid black line in a single day. About 16,000 lb. of beads are used annually on yellow No Passing zones only.

Louisiana: B. R. Richardson, Construction and Maintenance Engineer: "Until a short time ago, we had one machine for center line only, and used a black stripe on both concrete and asphalt pavement. We were able to stripe our concrete and asphalt, over



Another difficult foundation problem—
Solved by

KOPPERS PRESSURE-CREOSOTED PILES

This highway grade separation bridge on an access road in New Jersey presented the engineers with foundation trouble. One abutment and its wingwalls had to be built on the site of an abandoned, filled-in quarry.

As in most cases of this kind, pressure-creosoted piles provided a permanent, quick and economical solution. One hundred and fifty-five timber piles, pressure-creosoted by Koppers, were driven thirty-four feet into the fill. As the illustration indicates, the piles were driven in five parallel rows, over the U-shaped area occupied by the abutment and wingwall footings.

Whenever soil conditions are such that foundations need added support, pressure-creosoted piles should be your first thought. By adding necessary stability, they have permitted construction in areas that would otherwise have remained wasteland, have fortified the foundations of countless bridges, towers, heavy machines and similar structures and equipment.

The dependable protection that pressure-creosoting provides against decay permits cut-offs above the water table to be made safely.

When piles are exposed to marine borers and to the chemical and corrosive action of salt water and weather, the evidence is also overwhelming that pressure-creosoting provides the most effective, longest-lasting protection.

Koppers is equipped to treat piles in any length up to one hundred and twenty-five feet. May we quote on your requirements?

K
KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.
PITTSBURGH 19, PENNSYLVANIA

★ Stringing in a curve and preliminary spotting of center-strip with hand brush—California. Done in connection with a resurface project

4,000 miles, in about 8 or 10 months of continuous work.

"Several months ago, we purchased a new machine equipped to lay three stripes and at the present time are maintaining the black center stripe 6 in. wide and marking 'no passing' zones in white 4 in. wide. This is not proving entirely satisfactory; a large mileage of our pavement is 18 or 20 ft. and the heavier traffic consisting of buses, trucks, etc., runs almost continuously on the No Passing lines and they are not lasting as well as they should. I might also add that at the time we contemplated the purchase of this machine, we had in mind using reflector beads. However, as it is rather expensive and with traffic on the lanes almost continuously, we have not decided on future plans.

"I personally have given considerable thought to Missouri's method of putting the guide stripe in the lane center. While it would require additional mileage of the striping machine, I feel that it would be most satisfactory in this state, particularly on the narrow pavement."

Nebraska: (M. A. Butcher, ass't. traffic engineer): "Our equipment, built in 1940, is of our own design. We are using a Cab-over-engine 1½-ton truck with 150-in. wheelbase. On its platform are mounted three 60-gal. supply tanks, compressor and paint transfer tank. The compressor is a Ford V-8 engine of unknown capacity but sufficient to apply one solid centerline and two No Passing zone lines at 10 to 15 mph. It paints at 12 to 15 miles per gallon for a 4-in. line. Our paint has a consistency of about 70 to 80 K.U. The truck pushes the painting unit, which carries 4 spray guns with air curtains. The two centerline guns are mounted in line, and an intermitter has been provided so that either gun can be made to spray 50 ft. on and 50 ft. off. The control valve is worked by a separate operator."

Nevada: (Dan Indermuhl, ass't. engineer, traffic and signs): "No new equipment or procedure, except that the rate of travel has been increased, necessitating two to three pilots and flag cars. Most of the time we have two cars ahead and one behind, slowing down traffic and warning them. About 1,500 miles has been striped since May (through September), with another 300 to go. All striping operations are carried out by a 5 or 6 man crew under supervision of the Traffic Sign Superintendent."

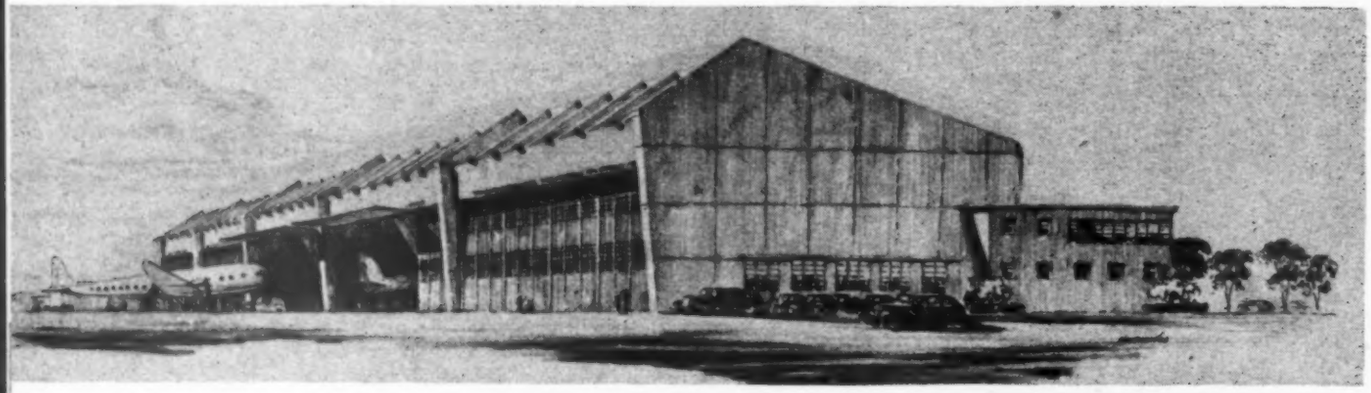
•

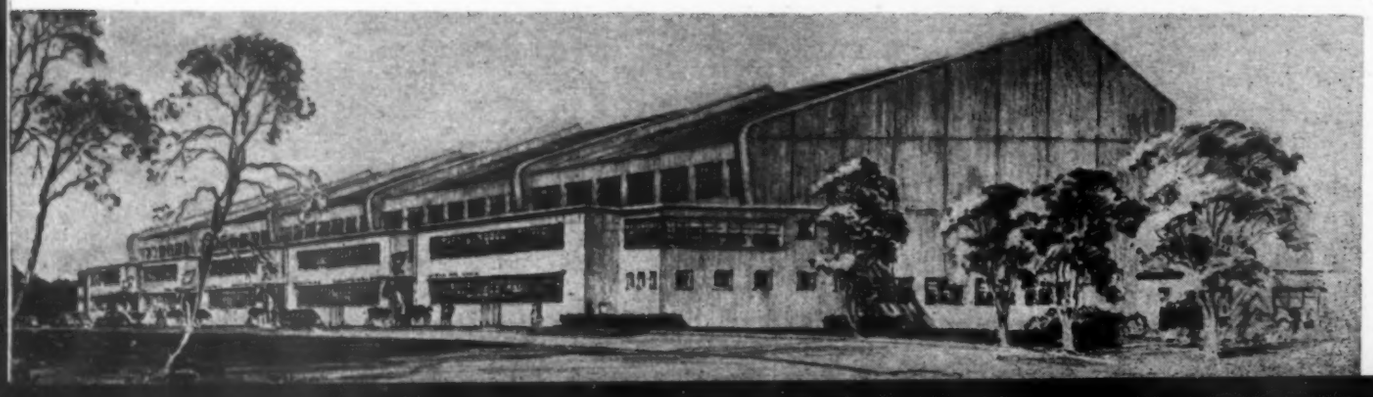
Hangar Contract Let at Washington Airport

Contracts have been let for building five additional aircraft hangars at the Washington National Airport, and for remodelling the central heating plant at the Airport. The work is being handled by the Public Buildings Administration for the Civil Aeronautics Administration. The Dyker Building Co., Inc., New York, was low bidder at $4,414,700.

The hangars will be of concrete and steel construction, and will have office and shops in a two-story extension at the rear of the aircraft space. Four of them measure approximately 280x180 ft., and the fifth 285x215 ft.

Hervey Law, Airport Administrator, announced that commitments for the rental of hangars to airlines have been completed which will include amortization, interest on the investment, and maintenance.





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LETTERS AND COMMENTS

Discussion of Article "Expressway Gutter Inlets"

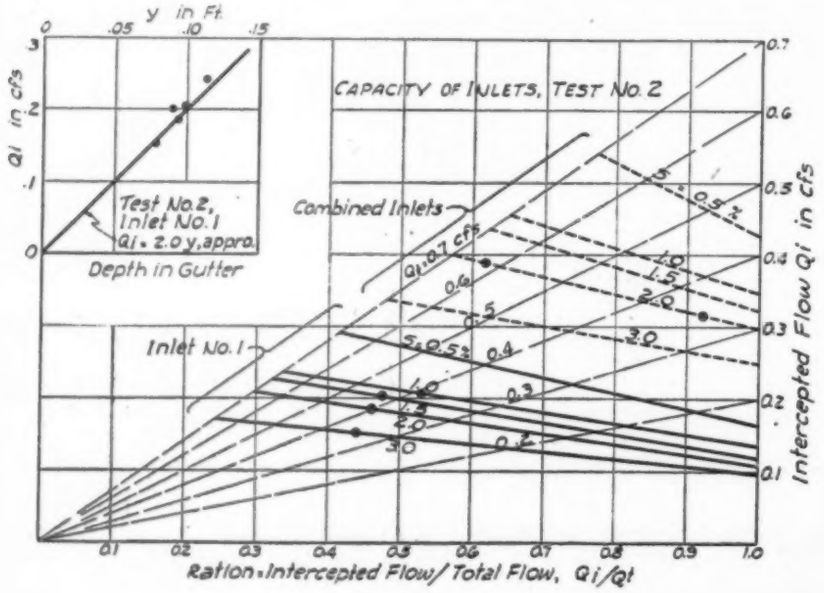
By E. C. Woodward
"Roads and Streets"
Dec., 1946, pages 69-73

By Carl F. Izzard
Public Roads Administration,
Washington, D. C., Feb., 1947

INTERPRETATION of the results of the full scale tests on a new type of gutter inlet for express highways developed by the Texas Highway Department as reported in ROADS AND STREETS for December, 1946, is clarified by reference to the attached graph. This type of graph was developed by G. S. Tapley, an hydraulic engineer for the Bureau of Engineering of the City of Los Angeles, for plotting the results of model tests on side opening inlets. The abscissa scale is the ratio, Q_i/Q_t, of flow intercepted to total flow and the ordinate scale is Q_i, the flow intercepted in cfs. If the total flow Q_t is constant then all the points for a given inlet on varying grades will fall along a straight line drawn through the origin and through the intercept $Q_i=Q_t$ at $Q_i=Q_t$ at $Q_i/Q_t=1.0$. This follows from the geometry of the figure, the slope of the line being Q_t.

In the tests described by Mr. Woodward only one rate of total flow was used. Thus for Inlet No. 1 in Table No. 2 the points plot approximately on a straight line for $Q_t=0.4$ cfs. In the tests which Mr. Tapley made the total flow was varied and in general the points for a given inlet on fixed grade tended to be a straight line with a minimum discharge at $Q_i/Q_t=1.0$. When the grade was increased the minimum discharge decreased.

In order to get some idea of what these minimum discharges might be for the Texas inlets, another plot was made of Q_i against the depth of flow in the gutter in feet (see inset graph). Although there are some irregularities, the points tend to line up in a straight line having the equation $Q_i=2.0$ y, where y is the depth of flow in the normal gutter in feet (based on n=0.013). A similar relationship for side opening inlets has been found from analysis of data reported by Connor in North Carolina Engineering Experiment Station Bulletin No. 30 "Design and Capacity of Gutter Inlets." An equation for the depth of flow in the gutter based on Manning's formula is $Q_t=1800\ s^{1/2}\ y^{8/3}$. When $Q_i=Q_t$, a simultaneous solution of these two equations gives $Q_i=1/(34S^{3/16})$. The minimum values of Q_i in the figure are based on this equation, straight lines being drawn through these points and the points plotted from the experimental data, on the assumption that the operation of this inlet is analogous to that of the inlets tested by Tapley.



The dotted lines show the capacity of a pair of inlets assuming the second inlet to take the flow passing the first in accordance with the curves developed for the first inlet. They show somewhat less capacity than reported for the combined capacity in Table 2; for example with $Q_t=0.4$ cfs on 2% grade, Q_i was actually 0.39 cfs, whereas the dotted curve shows 0.34 cfs. The increase in actual capacity over the computed capacity is undoubtedly due to the backwater effect caused by the warping of the gutter profile back up to the normal flow line downstream from the second inlet.

The graph also indicates that on a 0.5% slope the total flow was insufficient to develop the full capacity of the second inlet.

The important conclusion to derive from this analysis is that the efficiency, as plotted in Fig. 3 of Mr. Woodward's paper, varies with the total flow, becoming less as the total flow increases. In the example which he cites on page 71, with $Q_t=0.63$ cfs on a 2% grade, the efficiency would be about 61% instead of 96%, Q_i being 0.39 cfs instead of 0.60 cfs (intercepted flow would be slightly greater if allowance is made for backwater effect).

From the standpoint of storm drain design, however, the bypass flow is not as serious a problem as it might appear to be. Studies now under way by the Public Roads Administration, show that small flows can bypass an inlet without increasing the maximum rate of discharge at the next inlet because the bypass flow is temporarily backed up in the upper portion of the next length of gutter and doesn't reach the next inlet until after the peak of the discharge on that drainage area has been passed. The effect is to limit the peak discharge which the storm drain has to carry by temporarily storing the bypassed flow in the surface gutter near its upper end where the depth of flow would otherwise be small. In other words, instead of the depth in the gutter increasing from almost zero just below an inlet which has intercepted all the runoff above that point to a maximum at the next inlet, the depth of flow at the peak is almost uniform for the entire length of the gutter when the upstream inlet permits part of the peak flow to be bypassed.

The article is not entirely clear as to position of the trough used in the second series of tests. Section "B-B" of Fig. 2 is incompletely dimensioned and there is no statement as to the longitudinal extent of the trough with

(Continued on page 125)

"WHEN IT'S HEAVY GOING GIVE ME A WARD LA FRANCE"

On jobs where trucks must take real punishment and stand up, you can't beat a heavy-duty truck built with frame and body that can take it. The rugged Ward LaFrance fills the bill.

The trend is definitely to heavy-duty trucks because of proven performance and economy. Particularly in the construction field, up to 23% increase in demand for heavy-duty trucks is reported by contractors and highway engineers. In other fields of trucking, the big tractor-trailer combinations are hauling more and more tonnage.

See for yourself the advantages offered by the big, new Ward LaFrance—extra load capacity, reserve powered engine, heavy-duty construction throughout. Get the performance you have been looking for . . . and at low cost. See your local dealer today.

Look for the big truck with the exclusive "flat top" fender

WARD LAFRANCE TRUCK DIVISION
Great American Industries, Inc.

ELMIRA, NEW YORK

A Highway Builder Looks at Highway Engineering

(Continued from page 70)

and contractors.

Size of Jobs

A balanced program of large and small jobs should be made up to fit local conditions and promote competition, but not losing sight of the economy to be gained on large jobs.

Completions under current conditions are dependent on delivery dates of critical materials, which might dictate that large bridges be separated from other work.

However, it is believed that the current federal-aid highway program with the sizeable allocation for secondary roads will embody adequate small jobs for small contractors. There is a definite need for the development of more small contractors, and encouragement should be given to those who cannot afford huge outlays of funds for equipment. This can be done especially in secondary road programs. The small jobs serve as a sort of apprenticeship system for highway contracting.

Maintenance by contract also should be given serious consideration. The Committee on Economics of Highway Construction and Maintenance Methods of the Highway Research Board is gathering material on this subject. The contract method stimulates competition which is always conducive to more and better work for less money, and results in more rigid inspection and control of materials.

Improved Design and Construction

One further important factor in highway costs is the constant improvement in design and quality of construction, which undoubtedly will continue.

Greater care is taken in compacting the subsoil now as compared with previous times. Pavements are thicker and of better quality. Pavements are wider, and the entire right of way is wider. Alignments are straighter, grades are smoothed out requiring more cuts and fills. More structures are added to reduce traffic hazards. Specifications have been refined to improve quality.

All of these factors increase the per-mile cost of a highway. But the result is a highway which is probably less expensive to maintain, safer to travel, of greater capacity, and saving in vehicle operating cost.

I have dwelt at length on the elements of cost and what we can do to promote economy. We have higher prices. Now I would like to inject a new thought in our concept of measuring cost.

A New Concept of Highway Costs

We have always measured expense of highway construction in terms of cost per mile.

We need a revolutionary concept of highway costs in terms of modern requirements. The tremendous improvements in highway design and construction in recent years were required to accommodate more vehicles, heavier vehicles, and faster vehicles.

I dare say that the construction cost of a well-designed modern highway, if measured in terms of vehicle capacity per hour, is less than in prewar years.

Need for Construction

As you know, there had been consideration by some that work should not proceed while prices were high. I can assure you that in the belief of contractors, a highway department has nothing to gain from holding up all work to see what happens.

Contractors are the men who build your highways, and especially at this time when they are trying to rebuild their forces into more efficient organizations after the dearth of highway work during the war years, it is to your advantage to help prevent the loss of qualified contractors.

While statistics may show a smaller number of highway contractors operating now than during prewar years, many who combined with others or performed other work during the war are again coming into the highway field. New names will be coming.

The Department of Commerce reports that of all major industrial groups in the first half of 1946, the highest rate of entry prevailed for contract construction.

The Outlook

A study of the trends which I have discussed indicates that highway costs will level off on a new plane, that the immediate prospect is for stabilization of construction costs, and that some economy can be achieved by closer cooperation between highway officials and highway contractors.

Balanced against the trends for higher costs will be the development of more efficient machinery and methods, retarding of material price increases by competition through increased production, and an expected increase in the productivity of labor.

I believe the strongest force for the reduction of highway costs in the future will be the competition within the construction industry for more efficient methods of producing the highways of constantly improved quality which you will design.

•

Equipment Industry Continues to Face "Surplus" Impact

SURPLUS construction equipment sold and given away by the State Department, Foreign Liquidation Commissioner in foreign lands and insular possessions—now arriving by the shipload in the nation's seaports—is creating serious impact on the construction equipment industry, states President William A. Danner, Associated Equipment Distributors. [See editorial, March R&S.] AED's membership includes 800 distributors and 240 manufacturers of construction and road building machinery.

Large inventories of scrapers, bulldozer attachments and related equipment are in long supply in manufacturer and distributor plants, but sales of huge quantities of these items are still being held by the War Assets Administration domestically and in U. S. territories and possessions.

These latter sales by WAA, on which import restrictions are not imposed by law or regulation, combined with similar properties given to foreign governments under long term credit agreements, which are being sold for dollars to American speculators, are glutting the market in this phase of the industry.

If not stopped at once, curtailment in new production is inevitable and personnel lay-offs in some plants will follow.

Source of Trouble

A recent order by the State Department, which removed import restrictions on many surplus items sold in foreign lands, plus the rapidity with which speculators have grasped this golden opportunity for quick profit, is primarily the reason for this demoralizing impact in certain products.

There is every reason to believe that similar impact problems will develop rapidly in other construction equipment items as the traffic from foreign lands and our own possessions accelerates.

It was the intention of Congress when the Surplus Property Act was promulgated—and the Act so states—that surplus sold abroad should not be returned to the United States.

On the other hand, American business has concurred in the general viewpoint that surplus in critically short supply in this country *should* be returned for resale in the U. S. to fill urgent civilian needs. For example, cranes, shovels, tractors and motorized graders are in short supply at the present moment and current production schedules will not fill the demand for these products until late 1947 and early 1948.

However, based solely on the opinion of OWMR and CPA and without any consultation with industry to determine inventory and production schedules, the State Department opened the door to surplus imports right across the board.

This action constitutes a violation of the Act and must be stopped at once to prevent further irreparable dislocation of the domestic economy.

Mr. Danner further states that it is impossible for the construction equipment industry to compete on current market levels, with hundreds of millions in surplus given, loaned, exchanged or sold to foreign countries under long term credit contracts negotiated by the State Department, which only promise to pay, in from 20 to 55 years, an amount less than 25% of the original cost of the property, to the U. S.

Nor can industry compete with sales prices established by WAA domestically and in the territories and possessions, which are moving large quantities of equipment, under priority provisions of the Act, directly into the hands of users, the customers of normal trade channels.

Vicious Cycle

It is a vicious cycle which places free dollars in the pockets of foreign governments and permits speculators abroad and domestically to operate profitably on safe margins.

Testimony in this connection, was placed before the Surplus Property Sub-Committee of the House of Representatives Committee on Expenditures in the Executive Department on March 11, 12 and 13 by the Surplus Property Committee of the Associated Equipment Distributors and similar evidence was presented to the WAA Administrator.

We will continue to fight, President Danner states, for the establishment of a sound business approach to the surplus disposal problem, for legislative changes which will enhance rather than jeopardize the nation's economy, insofar as surplus is concerned, to the end that American industry may return speedily and unhampered to peaceful and productive business pursuits.

Personnel Changes in State Highway Department

E. L. Schmidt Now Pennsylvania Chief Engineer

E. L. Schmidt, New Chief Engineer

E. L. Schmidt became chief engineer for the Pennsylvania Department of Highways on March 1. He succeeds T. C. Frame, who has retired after more than 28 years' service with the department.

Mr. Schmidt has been with the Department since February, 1939, when he was made district engineer in charge of the Pittsburgh office. Previous to that he had 23 years' service in an engineering capacity for Allegheny County, Pennsylvania. He has been located in the Pittsburgh office during his entire tenure with the Department.

J. P. Ambler, district engineer at Hollidaysburg, succeeds Mr. Schmidt in the Pittsburgh office and W. E. Bailey, assistant district engineer in the Philadelphia office, succeeds Mr. Ambler as district engineer at Hollidaysburg. A. J. Bedard, heretofore assistant engineer in charge of construction in the district office at Harrisburg, succeeds Mr. Bailey as assistant district engineer in the Philadelphia office.

Minnesota Changes

J. C. Robberts has been appointed assistant maintenance engineer Minnesota Department of Highways, and C. C. Colwell has been appointed assistant construction engineer. Mr. Brataas, formerly district maintenance engineer at Rochester, Minn., has been appointed district engineer to succeed the late E. V. H. Brown. E. R. Boyce succeeds Mr. Brataas as district maintenance engineer.

New Director in Alabama

Ward McFarland has been appointed director and Herman Nelson, assistant director of the State Highway Department of Alabama.

Personnel Changes in Wisconsin

Principal changes of personnel in State Highway Commissions that have taken place during the winter are as follows:

John S. Piltz, formerly division construction engineer in the Eau Claire Division, has accepted an assignment in the main office at Madison as one of the assistants of Albert T. Bleck, construction engineer.

Joseph C. Jones, formerly assistant division engineer in the Madison area, has been made division engineer replacing Daniel J. Minahan, whose accidental death occurred Aug. 29, 1946.

Horace R. Hymer, formerly a resident engineer in the Lancaster Division, has accepted a main office assignment as one of the assistants to Albert T. Bleck, construction engineer.

Maxwell W. Fisher, formerly division maintenance engineer in the Green Bay Division, has accepted an assignment in Madison as one of the assistants to Wm. Hoenig, maintenance engineer.

W. W. Mack of Delaware Retires

Warren W. Mack has retired as chief engineer of the Delaware State Highway Department and has been appointed consulting engineer to the department with offices at Dover, Del. William A. McWilliams succeeds him as chief engineer. Mr. Mack has been connected with the department since 1917 as assistant engineer and secretary and then chief engineer.

Mr. Mack was graduated from the civil engineering department of the University of Vermont in 1904. In 1905 he was resident engineer for the Bangor & Aroostook R.R.; from 1906-1910 he was assistant engineer and resident engineer Grand Trunk Pacific Ry. and Canadian National Rys., on surveys and construction in Western Canada. He was superintendent Woodbury Granite Co. 1910 to 1917 when he entered the employ of the Delaware Highway Department.

Mr. Mack was treasurer of the American Association of State Highway Officials 1920-1939 and president in 1939. He was president of the Association of Highway Officials North Atlantic States in 1932.

One Change in New Hampshire

The only change in the personnel of the State Highway Department is that of F. A. Gardner, public relations engineer who died in December. It has been decided not to name anyone as public relations engineer at the present time. Laurence Morrill will have charge of highway marking, signs, road planting, etc.

Personnel Changes in Illinois

D. D. Starke, acting engineer of railroad crossings has been replaced by William J. Mackay.

H. B. Jay, superintendent of day labor construction, has been replaced by Thomas H. F. Norris, acting superintendent of day labor construction.

O. F. Goeke, district engineer at Dixon, Ill., has been replaced by R. M. Ferguson, assistant district engineer.

New State Highway Director in Georgia

The principal changes recently in the personnel of the State Highway Department is the appointment of Jim L. Gillis, Sr., to succeed G. T. McDonald, Engineer-Director.

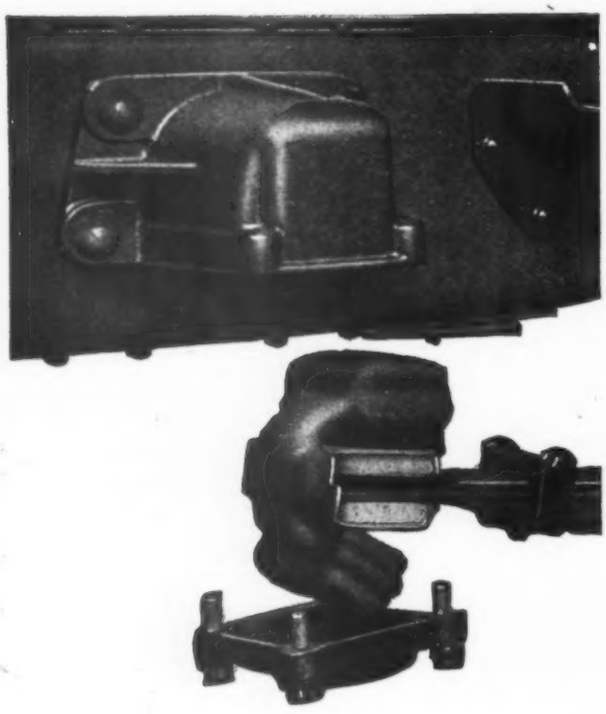
New Line-Up in Ohio

F. M. Williams

Following the election of a new governor there was an almost complete change in the executive engineering personnel of the Ohio Department of Highways. Murray D. Shaffer was appointed director of highways and Frank M. Williams, acting assistant director and chief engineer.

Other appointments as of Feb. 24 were: Ralph L. Wolf, executive secretary; Earl L. Reeb, chief engineer of maintenance; Homer E. Anderson, chief engineer of construction; George J. Thormyer, chief engineer of location and design.

No other truck has this...



It's a rubber Shock Insulator...developed by Mack engineers more than 20 years ago. It was—and still is—the best means of retaining spring ends.

Shock Insulators do away with binding metal surfaces...there is no metallic contact between springs and chassis. They absorb vibrations. The need for lubrication and adjustment at spring ends is eliminated. Squeaks, rattles, and fast wear of parts are unheard of. Shock Insulators provide smooth performance under heavy loads. They lengthen working life indefinitely.

But how about wear? Shock Insulators have been known to last over ten years. Security? It's impossible for the spring to pull out of its housing. Twisting? The spring can never twist. Removal? It's simple and quick. Shock Insulators aren't complicated.

Only Mack employs rubber Shock Insulators as spring-end connectors. That's another good reason why you get more work out of a Mack. More work goes into it.

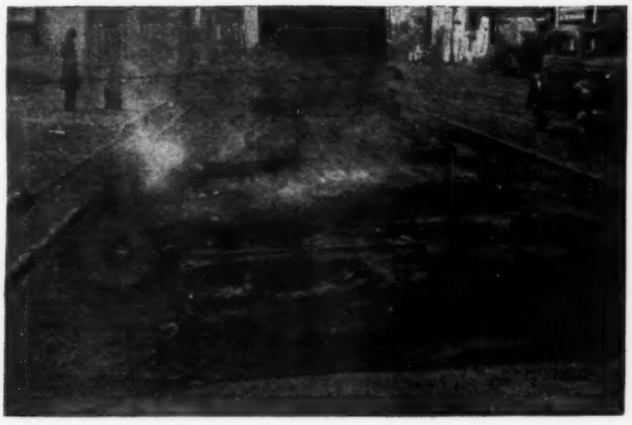
Mack

since 1900, America's hardest working truck

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada Ltd.

Trucks for every purpose

HAULING AGGREGATE and blacktop is the job of the four Macks owned by **H. H. McGuire & Company, Malden, Mass.** Spry and sturdy dumpers like this EH Model run between the plant and highway projects.



★ Surface heater of truck-mounted type used by the city of Los Angeles

Surface Heaters and Heater-Planers

Aid in 455,000 Sq. Yd. Asphalt Resurface Program in Los Angeles

Los Angeles owns truck-mounted heaters. Other street and highway authorities in Southern California commonly rent or lease heaters and also grader-mounted heater-planers. Equipment and methods briefly described

By L. Miller

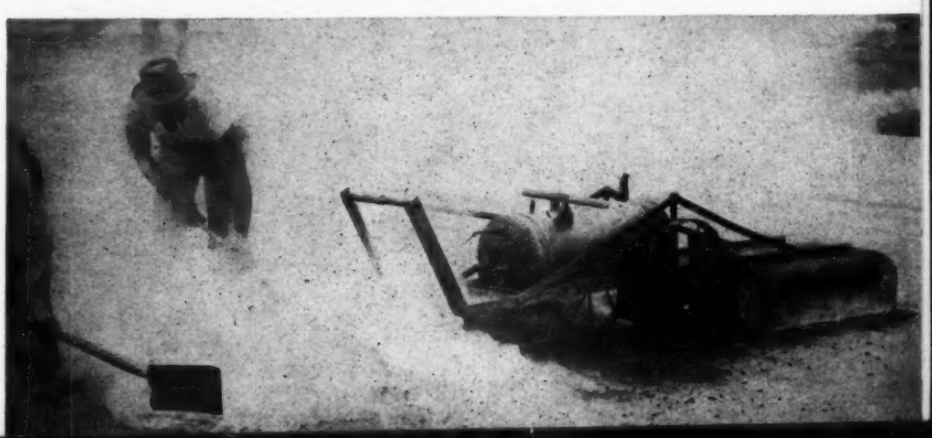
General Superintendent, Street Maintenance Division, Los Angeles Department of Public Works

THE SURFACE heater process of repairing asphalt streets has been used by the Street Maintenance Division of the City of Los Angeles since 1917. For this type of repair work our division now uses two different types of heaters, a commercially made surface heater and the Heater Planer of the Asphalt Pavement Planing Company of Los Angeles.

Our particular surface heaters are owned by the City of Los Angeles, but ordinarily in this area they are leased from the firm which builds them*, on a royalty basis. The surface heater is mounted on a truck chassis and uses a 4-cylinder gasoline engine, driving through a power reduction gear-box to operate a centrifugal blower. Regular diesel fuel which is stored in a 200-gal. tank, mounted at the top of the unit, feeds by gravity to the nozzle where it is atomized and burned in a single 3-in. burner mounted inside a hood.

The hood is built in the shape of an inverted hopper. It may vary in size, but the Street Maintenance Division has found that a hood 6 ft. long by 9 ft. wide and about 19 in. deep, covering 54 sq. ft., is the most satisfactory size. This hood is made of ⅜-in. steel, weighing about 1½ tons; is mounted on two skids which act as guards and keep the hood about 4 in. above the pavement. Skids support the hood as well as facilitating combustion. The hood is raised or lowered by a hydraulic pump which, together with a pump used for filling the fuel

★ Hand-operated surface heater on patching work in Los Angeles, as used by the State division of highways on arterial streets



*Equitable Asphalt Maintenance Co., Kansas City, Mo.

★ (Left): On this extremely heavy-traffic section of US 99, the asphaltic surface, although still "live," had become wavy, and it was deemed economical to plane the waves down to an even surface in lieu of scarifying and consolidating before resurfacing. The central 20 ft. of roadway width was specified to receive this treatment. (Right): Not more than ½ in. depth of cut in one pass was specified on the state project

tank, is operated by chains driven off the blower engine. When not in use the hood may be removed from the chassis.

Heater-Planer Details

The heater-planer is rented on an hourly basis. It is built on a heavy motor grader which has been modified for this particular use. The drawbar has been lengthened 14 in. permitting an insulated burner hood 8½ by 4 ft. to be installed ahead of the 4-ft. cutting blade which is mounted in lieu of a moldboard.

A 240-gal. fuel tank, installed in the rear, supplies fuel by means of a rotary pump to five 2-in. burners under 40 lb. pressure. A special blower furnishes air to the burners at varying pressures ranging from 16 to 22 ounces. Both the pump and the blower are driven by belts off the engine. A special differential has made it possible to reduce the forward speed of the grader to 1/3 mph. in low gear. In high gear the planer has a top speed of 8 mph. The machine with an overall length of 27 ft. and width of 7'10", weighs 30,000 lb.

The surface heater and the heater-planer are used to remove the old surface, prior to resurfacing, of an asphalt street that may be rough, broken up or has reached the stage where maintenance is no longer economical. The heater planers may be used to smooth streets where the asphalt still has life, by planing off the bumps. We have used the planer to groove sheet asphalt pavement to remove skidding hazards, particularly on a curve. And we have been using the planer quite extensively in the removal of a thin layer of asphalt prior to covering the street in our armor coating work.

The heater-planer after initial heating of the surface proceeds with the cutting blade set at about a 45 degree angle. This planes a 3-ft. strip. The heater-planer makes a continuous burn where the surface heater makes individual spot burns. At a speed of 1/3 mph. the heater-planer provides a 15-sec. burn period, which permits the removal of approximately 3/16 in. of asphalt.

★ A heater-planer on Los Angeles street work

Notes on the Use of Heater-Planers on U.S. 99, N. of Bakersfield, Calif.

Supplementing the accompanying article, the following brief data are presented on a rural arterial highway repair project observed by the "Roads and Streets" staff in 1946. The project consisted of heater-planer removal of wavy asphaltic concrete on 10.4 miles of U. S. 99 north of Bakersfield, California. Griffith Company held a contract, the principal item of which was 984,000 sq. ft. of heating and planing of existing surface. This was bid at $0.008 per sq. ft. The operation also called for 72 tons of asphalt paint binder, and 15,950 tons of mineral aggregate (plant-mixed surface) with 800 tons of SC-4 liquid asphalt. Complete cost, $88,300.

The special provisions allowed 75 working days for the job. In addition to the specification details noted under the photos, the speed of the heater-planer movement was directed to be so controlled that the maximum allowable depth of cut (½ in.) would be effected without tearing the surface or burning the underlying surface. The specifications stated, "Upon completion of one pass the surface shall be free from gouges, transverse humps, or depressions, with the surface having been in contact with the planer presenting a mosaic appearance."

Two heater-planers (grader-mounted) were employed. The planing operation was paid for on a basis of the specified 20-ft. width only, and the cost of removing burned and planed material was considered part of bid price. Additional details are given under the accompanying photos.

Heater Operation

The heaters are lighted by means of oil-soaked waste, ignited and thrown under the burner. The distillate is turned on and is then kindled by the burning waste. The amount of material to be removed from a street is determined from a blueprint of the job. This varies from two to three inches depending on the condition of the surface. The surface heaters may be placed side by side, staggered, or in tandem, and the heating is done from the heavier to the thinner removal. For the first half-hour it is necessary to make continuous checks to ascertain that you are heating to the proper depth.

Using the surface heater the heat usually penetrates about ¼ in. for each minute of burning. The heater sets over the place to be burned and then on signal, usually by a whistle, the operator proceeds to the next spot, making a series of spot burns. The idea is to heat and remove the old material as accurately to uniform crown as is desired so that the new material may be laid in a uniform thickness. Where an unusual depth is required, it is more desirable to make the removals in two or more heats. After 8 to 10 minutes of heating in one spot, the heat loss becomes too great.

The surface heater makes about five heats in 30 lin. ft. and then the burned material is bladed off with a grader. When the asphalt pavement is laid on a concrete base the asphalt is only heated sufficiently to cause sweating or a loosening of the binder at the base, then the paving may be broken up with a rooter. Overheating of the asphalt will cause a binding of the surface to the base. Besides the initial heat provided by the surface heater, the heat continues to penetrate further into the pavement for a short time, which is the reason for the grader not following immediately behind the surface heater.

The materials removed by the grader after the surface heater and that removed by the heater planer, are loaded into trucks with skip-loaders. Used materials are not practical for reuse for surfacing, but are often used for filling.

Precautions Necessary

Care must be exercised in the use of heaters close to trees, shrubbery, plate glass windows or other objects that may be damaged by the intense heat. For this purpose a large sheet of asbestos, mounted between two pipes, is provided as a shield. A smaller metal shield is used to protect concrete curbs and gutters against the heat.

★ The burned and shaved material, left in a windrow by the grader blade, was thrown laterally and spoiled alongside the roadway using a small farm tractor with farm-type land leveling blade, traveling at high speed. Planer here has worked to the centerline from the left

Our program for the fiscal year 1946-47 calls for 2,037,000 sq. ft. of heater process removal in connection with asphalt resurfacing and 2,050,-000 sq. ft. of removal in our armor coat program, or a total of 4,087,000 sq. ft. of burning.

•

Emergency Roadside Phones

Three roadside telephones are being installed along the Elizabeth-Newark link of New Jersey Route 25 (U. S. 1) under an agreement with the New Jersey Bell Telephone Company.

Coin box type phones are designed for emergencies on the three miles of state artery which is being modernized from four to eight lanes to accommodate "the world's heaviest traffic". Part of the alignment is through undeveloped area and the communication facilities will be time savers in car failures or when other needs arise.

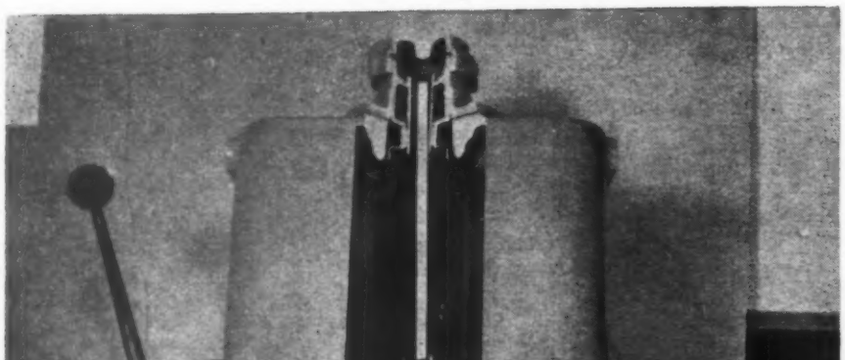
Plans Re-Use of Condemned Houses on R-W

The New Jersey state highway department plans to make available for re-use the structures obtained in the purchase of road rights-of-way, it is announced. In the negotiations for highway planning a large majority of owners often retain possession of the homes and have them moved to new locations. In a number of cases, however, sales are made outright to the State and when offers are not given for the buildings at public sale later they are listed for demolition.

Under the arrangement proposed the materials and properties surrendered to the highway department would be dismantled by the contractor in a more careful manner to permit assembling at another site, in any cases where it was not feasible to move the complete buildings to new foundations.

★ One of the motor grader mounted heater-planers familiar to road and street maintenance men in Southern California. Seen on a state road resurface contract, U. S. 99 north of Bakersfield, summer, 1946

Service and Maintenance of the New Hydraulic Power Control System



★ Cut-away view shows the new LaPlant-Choate Hydraulic Power Control Unit with tank, control valve and pump—all in one unit

Following suggestions supplied by LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa.

THE pump, control valve or reservoir can each be completely serviced without disturbing either of the other units. The rotary shaft seal and drive shaft may be completely serviced without dismantling the pump, by removing a retainer cap from the mounting flange face. The filter screen may be cleaned by removing six capscrews and withdrawing the complete filter and filler cap assembly. Easy means of cleaning the cored passages and interior of the reservoir are provided. Pump and valve can be dismantled for inspection without the use of pullers or special tools.

As with any hydraulic system, good maintenance and a knowledge of how to operate it properly will pay dividends in more trouble-free operation. The need for servicing of this hydraulic system is indicated by its failure to function properly, either wholly or partially.

For example, in the case of a dozer or snow plow, trouble in the hydraulic system will be indicated by the failure of dozer blade to lift or hold up, or take too long to raise.

Such failure might be due to a number of causes, but the principal ones are: 1. Insufficient oil; 2. Worn or damaged parts; 3. Obstructions in hydraulic lines; 4. Oil leaks; 5. Insufficient relief valve pressure; 6. Valves not seating; 7. Oil heating or foaming; 8. Improper operational methods.

1. The most common failure of any hydraulic system is lack of sufficient oil to operate the system properly. Check oil in reservoirs at the first sign of sluggish operation. Always check oil-level with hydraulic jacks extended.

2. Worn or damaged parts cause the oil to by-pass, thus reducing oil pressure which in turn causes the system to work sluggishly. Worn or damaged parts can be discovered by inspection. Wear plates, pump gears and needle roller bearings can be inspected by removing the bearing housing. Drive shaft and bearings can be inspected by removing the oil seal housing and inner bearing housing. The remedy, of course, is replacement of worn or damaged parts, except when parts are reversible, as in the case of wear plates. Pump body wear is caused by worn needle roller bearings and gear shaft which permits gear teeth to contact the body. However, the pump body can stand considerable wear before its replacement is necessary.

3. Obstructions in hose or pipe can be located by opening couplings or by removing the hose for closer inspection.

4. Oil leaks are due to broken or damaged oil lines, worn or loose packing, worn parts, such as worn valve core and body, scored valve core and body, and broken or scored jack piston or cylinder. All these parts should be checked for leaks and tightened if possible to prevent leaks. Otherwise, the parts must be replaced. For example, the rotary seal and seal seat assemblies of the drive shaft must be replaced if oil is leaking at this point. Rubber gaskets and seals must be completely dry and free of dirt and oil. Seals must be assembled with care and properly installed.

5. The factory setting of the pressure relief valve is 1000 lb. It controls volume and pressure of the oil in the system and its setting must be maintained. To adjust the pressure install pressure gauge by removing the pipe plug in the valve and block off all lines by turning shut-off cocks to shut-off position. Remove relief valve cap, back off jam nut, and turn adjusting screw clockwise to increase pressure. When adjusting pressure, the engine should be running at normal operating speed or R.P.M.

6. Valves not seating will prevent the proper functions of the hydraulic system. This may be due to worn or damaged valves, or to foreign matter such as metal or rubber particles under seat lodged in the valve. The remedy is inspection and removal of the foreign matter and reseating or replacing valves.

7. Oil heating or foaming is due to either insufficient oil in the reservoir, use of the wrong kind of oil or dirty oil or insufficient relief valve pressure.

Remedies for this condition include the use of the proper oil. Straight mineral oil S.A.E. 10 is recommended. This oil should be checked often and changed as directed, depending on working conditions. The oil screen and copper mesh in tank breather should be kept clean, washed at least once every 150 hours—oftener if dust conditions are prevalent. When refilling, air should be forced out of the system.

Improper operational methods include such factors as operating at insufficient engine speed, operating in too high gear, leaving controls on positions too long, etc. These causes, of course, cannot be remedied by maintenance but call for a knowledge of how to operate the machine properly.

Lubrication Simplified

(Thanks to the Texas Company for this helpful information)

ADVANCES in development and manufacturing of lubricants have made it possible for lubricating practically all construction machinery with 8 lubricants (see chart). Economy, efficiency and orderliness will take the place of confusion in handling of lubricants, all the way from the storehouse to final application. Better lubrication of moving parts will result.

That a few lubricants will properly take care of all kinds of construction equipment was proven by the army under the severest possible conditions. The simplified lubrication plan of the army was carefully worked out in advance with co-operation of the automotive, construction and oil industries.

The adoption of a simplified lubrication plan does not mean that the present lubrication charts, which have been carefully prepared by the machinery builders, need be revised. Much of the construction machinery goes to operators who can follow the charts exactly and use lubricants specified.

SIMPLIFIED LUBRICATION PLAN FOR LARGE CONSTRUCTION PROJECTS

Part Requiring Lubrication	Hot Weather—Consistently Above 90° F.	Summer—Lowest Expected: Above 32° F.	Mild-Winter—Lowest Expected: Above 10° F.	Severe Cold—Lowest Expected: Below 10° F.
Gasoline and Diesel Engines	Heavy Duty Oil SAE 30	Heavy Duty Oil SAE 30	Heavy Duty Oil SAE 20	Heavy Duty Oil SAE 10
Gear Bones Bearings (severe service) Chain Drives Flexible Couplings Universal Joints Other Oil Lubricated Parts in Heavy Duty Service	Gear Oil SAE 140	Gear Oil SAE 90	Gear Oil SAE 90	Gear Oil SAE 80
Hydraulic Mechanisms Air Cleaners Air Compressors Bearings (normal service) Electric Motors and Generators Other Oil Lubricated Parts in Light Duty Service	Straight Mineral Oil SAE 30	Straight Mineral Oil SAE 20	Straight Mineral Oil SAE 10	Straight Mineral Oil SAE 10
Wheel Bearings Hand Packed Ball and Roller Bearings	Wheel Bearing Grease No. 2	Wheel Bearing Grease No. 2	Wheel Bearing Grease No. 2	Wheel Bearing Grease No. 1
Track Rollers and other frequently lubricated bearings working in mud and water	Track Roller Lubricant—Heavy	Track Roller Lubricant—Medium	Track Roller Lubricant—Medium	Track Roller Lubricant—Light
Other grease fittings	General Purpose Grease #2	General Purpose Grease #1	General Purpose Grease #0	General Purpose Grease #0
Wire Rope and Cables	Cable Lubricant	Cable Lubricant	Cable Lubricant	Cable Lubricant
Open Gears	Open Gear Lubricant—Heavy	Open Gear Lubricant—Medium	Open Gear Lubricant—Light	Cable Lubricant

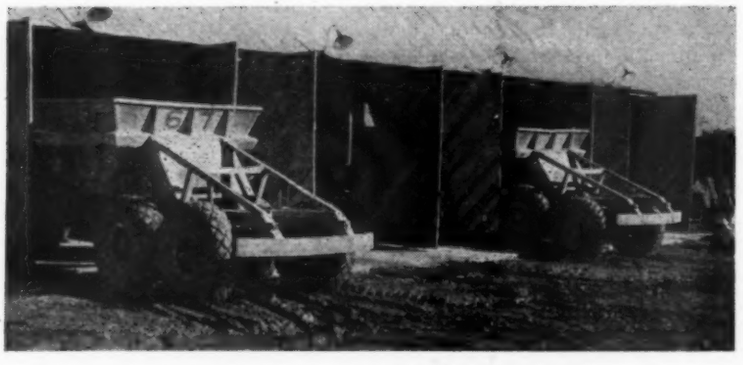
N. Y. State Roadside Trees Trimmed by Contract

A contract for professional tree surgeons to remove dead trees and prune others on certain state highway rights-of-way was awarded last winter to the Davey Tree Expert Company of Kent, Ohio. Modern methods were applied to repair damaged trees, to prolong their life and to safeguard them from injury as a result of the removal of dead limbs.

★ Lined up at shift change, the wagons await greasing and refueling along both sides of the private asphaltic concrete haul road

Servicing a $2,000,000 Earth-Moving Fleet

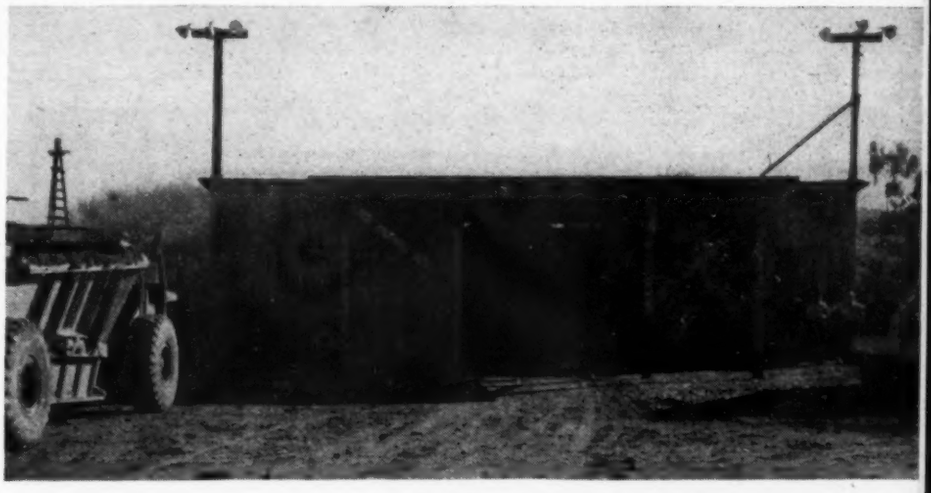
★ For the big 33-yd. wagons a special 3-bay shop building was made by erecting two Quonsett-type buildings. Floor space thus secured is about 30 x 50 ft. Individual bays for this size of wagon were required to be wider than usual. Engines are handled by a crane mounted on a traveling cross beam which moves on parallel rails through the rear half of the building. The rear half leads into the machine shop building adjoining



★ The 33-yd. wagons stick their noses in the shop for minor engine work; go clear in for major attention

★ A small machine shop was assembled in this building (rear view) to make parts not quickly available. Such equipment was kept to a minimum, however

★ Over a thousand 1400 and 1800 size tires are in service at any one time. Extra tires are stored in this shed, which faces onto a spacious swing-around. Tires are kept on two decks and handled with a chain hoist



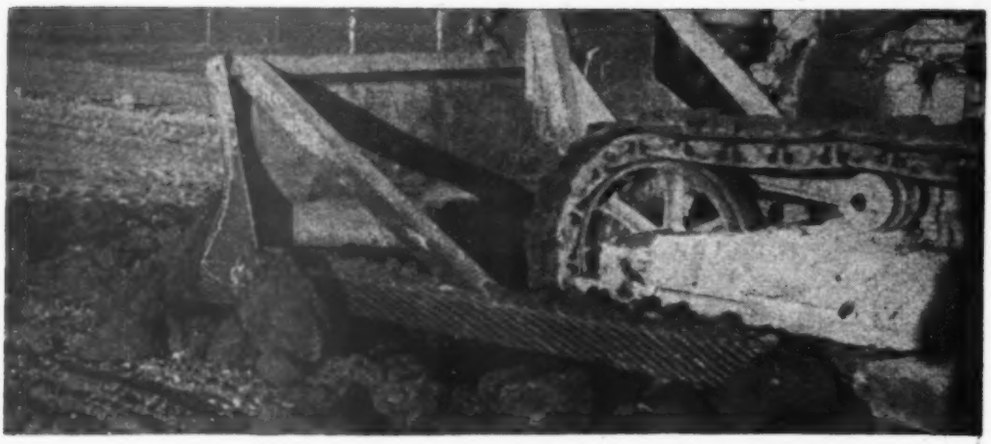
Contractors on the San Francisco Airport have kept 80 wagons and six big shovels working with relatively simple field shop and service organization.

FIFTY thousand cubic yards of dirt per day on a four-mile drag is big production on any man's job. Most contractors never expect to work it that big and fast. Don't need to, as a matter of fact. How Macco Corporation and Morrison-Knutsen Company, Inc., joint contractors on the San Francisco airport, kept up this pace during the summer of 1946 was described in Feb., 1947, ROADS AND STREETS. Herewith are a few supplementary notes and pictures on the equipment servicing end of the project.

To summarize in a nutshell, the contractors used few special tricks and little fancy equipment to speak of, but just went about the good old business of seeing that every machine got its prescribed daily routine of greasing, tire check-up, and hood-lifting. A good machine and automotive shop, but not as big a one as you might have expected, a few special types of foreman responsibility (such as for tires), and enough loyal top-notch construction mechanics to form the nucleus of a good service crew—that's just about the whole story. Oh, yes, may we add that the project chiefs have been eagle eyed

★ The 13 and 16-yd. wagons get their fixin' done in a smaller, open-type, concrete floored bay, also backing onto the machine shop

★ Up at the pit. This small tow-type electric welder is an adjunct to a semi-permanent repair shop constructed at the pit primarily to serve the shovels. This shop supplements the main shop a mile down the haul road



★ Seen on the Macco and and Morrison-Knutsen projects—a nice example of hard-facing bulldozer side arms. The top and side surfaces are armored by diagonal parallel beads and the hard-facing also extends over the lower part of the end frames of the dozer apron

fellows who ride around all day looking for mechanical illness before it happens and giving operators the double-O on how they are handling their rigs.

The outfit used last season, as you may have read previously, consisted mainly of three 6-yd. electric shovels and three 2¾-yd. diesel shovels in the pit, plus an 80-wagon fleet of fast earth-hauling units. The wagons included a score or more specially built 33-yd. bottom dump truck-trailer units; and fifty or more 13- and 16-yd. self-powered machines. A few dozers on the grade and at the pit, a few tractor-drawn pans and motor graders, several big "economy size" sprinkler trucks, plus pick-ups, service trucks and a little "miscellaneous"—there's your fleet. Two million bucks on the hoof and averaging surprisingly new for these times.

Sixty-five or so trucks were rolling at any one time, and some hundred service men and mechanics were required for two-shift operation.

Fuel tanks were buried underground in a layout which permitted several rigs at once to swing in for a refill. Most refueling, however, was done at shift change.

The mechanical work was concentrated at a spacious yard and group of shop and service buildings located midway along the contractors' private 4-mile haul road. We'll let pictures and captions carry on from here.

•

Philadelphia—Plans for a 4-lane vehicular tunnel under the Delaware river south of the present Camden bridge, to cost $25 million, are under consideration by the Delaware County (Pa.) Authority and the Gloucester County (N. J.) Tunnel Commission. First talked up in 1932, this tunnel would connect with the major highways of the region and by-pass much traffic around Philadelphia along the Washington-New York axis.

New Construction Equipment and Materials

1

Snow Scoop

A scoop that can be mounted on any truck with hydraulic dump and does not tie up the truck for other uses, has been placed on the market by Howe Brothers, Troy, N. Y. The scoop can be attached to snow plow

Howe Snow Scoop

hook-up or directly to truck frame. It can be installed in 4 man hours and removed in 15 minutes. The scoop is hydraulically controlled by mechanical connections with dump body which are easily made and removed. The scoop is 6 ft. wide, 2½ ft. high and 4 ft. deep and weighs with attachments 735 lb. It will carry 2¼ cu. yd. In warm weather months the scoop can be used for removing leaves or any light debris.

2

New Valve Grinding Tools

A new Thor valve refacer and a new Thor valve seat grinder, complete with accessories, for all types of automotive valve and seat refinishing, has been announced by Independent Tool Co., Chicago, Ill. The new valve refacer features a dual electric motor design, sturdy slide rods and solid, balanced construction —all specially engineered to provide high precision valve refinishing. Another important new advantage is the "4 in 1" butt end grinding attachment, which provides, as a unit, settings for four separate operations—grinding the rocker arm, tappet, valve stem, and dressing the wheel. The new valve seat grinder is a 5¾ lb. tool with an exceptionally powerful universal electric motor and a cushioned-design feature introduced to provide positive automatic precision with a minimum of operator control. Introduced with the grinder is a complete kit of accessories, including a newly designed Thor wheel dresser, pilots, wheels, etc., all packed in a metal carrying case.

3

New Bulk Cement Carrier

A new bulk cement carrier, introduced by Hercules Steel Products Corporation, Galion, O., transports a load of from 100 to 110 bbls. of dry cement and is powered to discharge the full load in 4 minutes. The carrier is particularly designed to haul dry bulk cement from mill to warehouse and from warehouse to the job or individual contractor. The body of the new cement carrier has three manhole filler openings. Each opening has a hinged cover with manual locking device and is fitted with a tubular rubber gasket. The discharge door at the rear end of the body is equipped with a circular door, also fitted with a rubber gasket to prevent leakage. Operation of this door is by a threaded shaft which is turned by a large handwheel, thus offering control of the rate of discharge. The discharge chute is fully enclosed. The power unit is a Wisconsin air cooled gasoline engine of four cylinders, and the carrier is mounted on a trailer.

Model 100-B Bulk Cement Carrier

Mail Inserted Card

For data on equipment described on these pages. See also inquiry blank on page 129.

4

New Gauge for Fine Grading

An attachment for road graders that is claimed to assure a fine grade cut to exact dimensions with uniform depth throughout, has been placed on the market by Road Grader Gauge Corporation, Wilmington, Del. The

Rear View of Right Gauge and Wing Extension with Allis-Chalmers Grader Base

atttachment consists of a right and a left gauge, so designed as to be attachable to any standard road grader. Each gauge consists of two parts: A section to be secured to the moldboard of a grader to act as a base for the gauging parts, and the gauging parts consisting of an arm and roller so devised as to regulate, by adjustment, the position of the cutting edge of the grader blade to assure the desired depth of cut. The rollers are designed to run parallel with the grader and can be adjusted to various angles. They may also be adjusted close to the end of the grader blade where road forms only are used. When a concrete slab

forms one side of the lane to be fine graded, either roller arm may be extended so that the roller will not be too close to the edge of the concrete, thereby eliminating any danger of chipping. The road grader and gauges together form an integrated unit; with the grader supplying the necessary pressure and motive power to keep the gauge rollers in contact with the road forms and the adjustable parts of the gauges regulating the exact depth of the cutting edge of the grader blade.

5

Equipment Travels on Road or Rail

A dual purpose vehicle, known as the Evans Auto-Railer, designed for operation on railroad tracks and highways has been placed on the market by Evans Products Corporation, Detroit, Mich. The unit has a Quickway ¼ cu. yd. truck shovel mounted on an International 147 in. wheelbase chassis. The full revolving truck shovel is powered by an International Harvester 4-cylinder engine. Attachments fasten to universal boom foot connection for quick conversion from shovel to trench hoe, crane, dragline, clamshell, orange peel and pile driver. The Auto-Railer can be run over the highway to the railroad crossing nearest the point of work and then run on the track. All driving and braking is through special pneumatic tires

Evans Auto-Railer

which enable operation under all track and weather conditions. Flanged steel pilot wheels, mounted on large tapered roller bearings, are designed to hold and guide the vehicle on the rails. The flanged steel wheels carry all the weight not carried by the pneumatic tires. The pilot wheels and axles are raised and lowered hydraulically by controls on the dash.

6

New Electrode

A new electrode, Airco No. 375, for machinable welds on cast iron has been announced by Air Reduction Sales Co., New York, N. Y. This is an electrode with a high nickel core wire and a heavy extruded coating that has a possible application wherever an electrode is used on cast iron. It is felt that this electrode will be of special use in the automotive field for production line repair work and for use on all castings requiring machinable welds. Ordinarily preheating is not necessary. This new electrode may be used on either AC or DC and is available in 5/32 in. and ⅛ in. diameters. The manufacturer plans to add 3/32 in. and 3/16 in. diameters if the demand for them is large enough to warrant their addition.

7

New Hydraulic Units for Tractor-Dozers

A new low-cost hydraulic conversion "package" designed for D-2 and D-4 tractors equipped with hydraulic dozers has been developed by La Plant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia. Designed for hooking into existing hydraulic systems, these new units make it possi-

ble to operate a 2 or 4-yd. scraper in combination with present dozers without having to purchase an addi-

Combination LaPlant-Choate C-44 Scraper and Caterpillar D-4 Tractor

tional hydraulic system for scraper operation. The conversion units are available in two designs — one for adapting the new 2-yd. LaPlant-Choate scraper to present D-2 hydraulic dozers and the other for adapting the 4-yd. scraper model to D-4 dozer units. The same assemblies can also be used effectively on other makes of hydraulic tractor-dozers equipped with front mounted pumps and four-position valves, as long as the capacity of the pump and horsepower of the tractor are adequate for scraper performance. For D-4 tractors, equipped with hydraulic dozers, the conversion assembly consists of two valves which mount on the rear of the tractor with manifold and necessary hose for connections to the hydraulic circuit. One valve operates the scraper bowl and the other operates the ejector and apron of scraper. Both dozer and scraper can be operated entirely independent of each other without the use of the shut-off valves. The conversion unit for D-2 tractor-dozer consists of special combination piping fitted into the hydraulic system and is operated by the same valve which operates the dozer. The hook-up of either arrangement is a simple job and can be done without special tools.

8

New 3-Axle Tandem

A new 3-axle tandem roller to be known as the KX-25 has been developed by Buffalo-Springfield Roller Co., Springfield, O. The roller has an

KX-25 3-Axle Tandem Roller

approximate metal weight of 12 tons and a ballasted weight of 18 tons. The wheel base is shortened to give added maneuverability, while the rolls are widened to give increased rolling width. All the latest improvements found in the Kt model tandems are incorporated in this new 3-axle machine.

9

New 100-Ton Compaction Unit

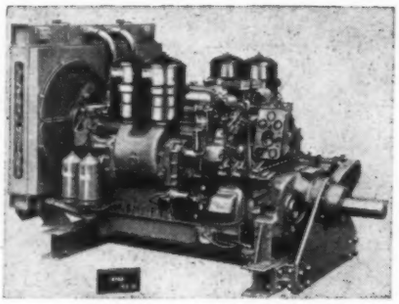
A new compaction unit of 100-ton capacity has been specially designed and constructed by the Southwest Welding & Machinery Co., Alhambra, Calif. One of these units was used on the construction of the Clover Field Airport, near San Francisco, Calif. Guerin Brothers, San Francisco, Calif., are the contractors. The unit is equipped with five, 36-ply Goodyear earthmover tires—three on the rear of the vehicle and two on the front. This feature of design is stated to distribute the load equally on all tires and permit them to track in staggered formation.

100-Ton Compaction Unit

10

New Diesel Engines

New and improved General Motors Series 71 "Twin 6" diesel engine models are now in production by the Detroit Diesel Engine Division of General Motors Corporation, Detroit, Mich. Each Twin unit is made up of two basic GM 6-cylinder 2-cycle engines mounted side by side and geared to a single shaft. Units are offered with either right or left-hand rotation. Continuous BHP at 1800 RPM is 276 with maximum intermittent rating of 400 at 2000 RPM. Probably the most outstanding feature of the new models is the variety of power take-off arrangements that are being made available. Versatility is the keynote. Any one of four different transfer gear types can be



Diesel Model 12103 Twin-6 Engine with Heavy Duty Take-Off

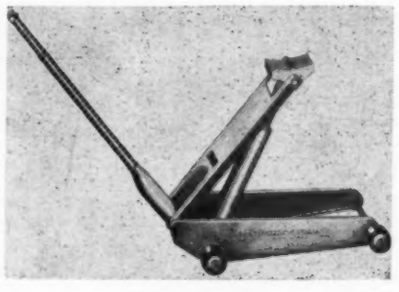
selected as follows:

1) The H.D. or heavy duty power take-off has been designed to take pulley and chain drive side thrust without the need for a special cradle-mounted sheave or sprocket. 2) The S.S. or Stub Shaft "fills the bill" with any of the various types of couplings encountered with heavy duty machinery. 3) The D.F. or Drive Flange is available for installations where the driven machinery is to be connected directly to the power unit. 4) The O.H. or S.A.E. "O" size housing has been designed to support any close coupled power take-off within the proper horsepower range. Particular attention has been given to its application with torque converters. Gear ratios of 1:1 direct drive, and 1.33:1, 1.77:1, and 2:1 reduction are available with each of the four transfer gear types. An increase in the shock load capacity over earlier models has been accomplished by the introduction of improved heavy duty transfer gears constructed with a 25% increase in face width.

11

New Hydraulic Service Jack

A lightweight hydraulic jack of new design has been announced by Lee Engineering Co., Pawtucket R. I. The unit, known as "Auto-Lift" jack, is of heat treated aluminum and steel and only weighs about 65 lbs. Wheels are steel, 3 in. diameter, 1¼ in. wide. Chassis is 24 in. long. The hydraulic cylinder is quick-acting and has a



Auto-Lift Jack

3,000 lb. capacity. The "Auto-Lift" can be lowered as slowly or as fast as desired and can be stopped at any point on the way down. This action is controlled by the telescopic handle which is adjustable in length and can be removed from the base if desired. The lifting range of the new jack is from 4½ in. to 22 in.

12

New Welding Electrode

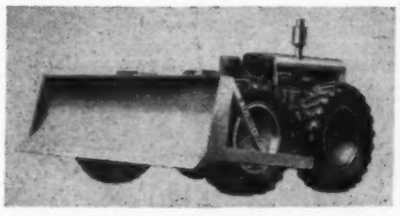
A new electrode reported to put cast iron in a class with steel for ease of welding and finishing has been developed by Harnischfeger Corporation, Milwaukee, Wis. The new electrode, known as "Nicast," is

stated to be particularly useful for repairing broken castings, building-up worn castings, correcting machining errors and welding cast iron to steel. Welds produced by "Nicast" are stated to be strong and non-porous and fully machinable in both the weld and fusion zone areas. The unusual machinability of "Nicast" makes it possible to drill, tap, mill or machine weld deposits in any manner, shape or form. Most applications require no preheating or postheating and welds will withstand hydrostatic pressure. "Nicast" is an all-position electrode and performs well in flat, vertical, overhead or horizontal work. "Nicast" is now available at P&H distributors in either ⅛ in. or 5/32 in. x 14 in. sizes.

13

New Rubber-Tired Bulldozer

A high-speed rubber-tired Tournadozer has been announced by R. G. Le Tourneau, Inc., Peoria, Ill. This Model C Tournadozer, latest addition to the LeTourneau line of rubber-tired earthmoving and construction equipment, is powered by a 160 hp. diesel engine. It has four forward and four reverse speeds ranging up to 12 m.p.h. Engineered to extend the speed and economies of rubber-

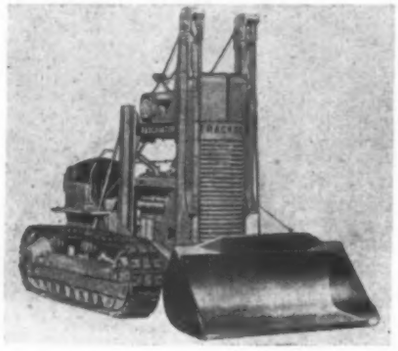


Model C Tournadozer

tired equipment into the dozer field, the Tournadozer features many new developments in design. It has a Tournamatic constant-mesh transmission, engineered especially to meet the requirements of heavy construction work. With this transmission, the operator can select any gear ratio or change from forward into reverse with no shifting of gears and no loss of momentum. The operator steers by use of air-actuated disc clutches and brakes controlling the two wheels on each side. The bowl is cable-controlled and is operated by an air-actuated power unit. Overall specifications on the C Tournadozer are: wheelbase 5 ft. 11⅝ in.; length 15 ft. 2 in.; height 7 ft. 11 in.; width of blade 11 ft. 3 in.; height of bowl 44 in.; height blade can be raised above ground 44 in.; distance blade can be lowered—unlimited; shipping weight approximately 14½ tons.

14
New Tractor Excavator

With the announcement of the Model T6 Traxcavator, Trackson Co., Milwaukee, Wis., has expanded its line of tractor-excavators to four, for four sizes of "Caterpillar" track-type tractors. The full line now includes bucket capacities ranging from ½ to 4 cu. yds. The T6 is mounted on, and engineered as a



Model T6 Traxcavator

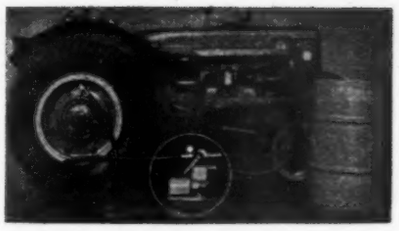
unit with the "Caterpillar" D6 tractor. Buckets of 1½ or 1¾ cu. yd. rated capacity are standard with the new T6; quarry, heavy duty and other buckets for special uses can also be supplied. A bulldozer blade, quickly interchangeable with the bucket, is also available.

15
Colored Para-Plastic

After considerable research and experimentation Servicised Products Corporation, Chicago, Ill. has developed a process by which its Para-Plastic joint sealing compound will be available in several colors. In addition to the black, the colors green, red, gray, cream and yellow Para-Plastic will be available. This recent development is expected to result in many new uses for this rubberized seal which conforms to Federal Specifications SS-F-336 and is used to seal expansion joints in all types of concrete construction.

16
New Pump

A new lightweight pump for liquid filling tractor implement and construction equipment tires has been placed on the market by Gorman-Rupp Co., Mansfield, O. Available in either electric motor or gasoline engine driven models. These pumps will evacuate tire of liquid or air and then fill with water or calcium chloride solution as recommended by tire



Lightweight Pump

manufacturers. Pumps are completely self priming. 60 PSI capacity prevents over-inflation. Optional equipment includes tank for use as an air compressor.

17
New Weed Killer

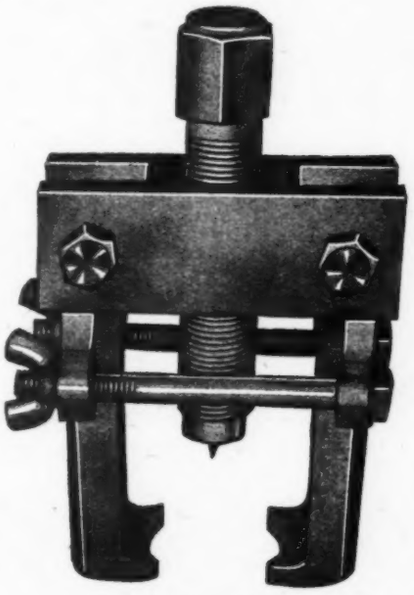
A new sodium salt type of 2.4-D acid weed-control chemical has been placed on the market by G. W. Smith & Sons, Dayton, O. It is claimed this preparation will not harm grass, but will permanently kill all types of broad-leaved weeds, such as dandelion, bindweed, poison ivy, poison oak, plantaine, thistles, ragweed, etc. The compound contains a powerful wetting agent which facilitates its quick absorption by the broad leaves of the weed, after which, it is drawn down into the plant to the very root tips.

As the positive killing action takes effect, the green leaves slowly turn brown and dry up completely. At the same time, the stem and roots shrivel and die. The entire chemical action is completed in from two to four weeks leaving the weed completely lifeless.

18

Truck Pitman Arm Puller

A new special tool of particular interest to truck operators has been announced by Owatonna Tool Co., 319 Cedar St., Owatonna, Minn. This new OTC truck pitman arm puller pulls the pitman arms on practically all



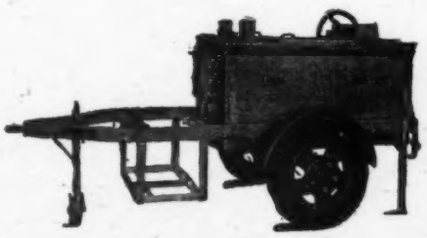
Pitman Arm Puller

makes of trucks. It is adjustable to size and is short-coupled enough to get into restricted quarters. It is well built to handle this difficult job and rugged enough to stand years of tough service. Puller arms are drop-forged for additional strength.

19

New Double Vat Kettle

A new kettle designed to heat and melt rubberized asphalt joint sealing compounds has been produced by Aeroil Products Co., West New York, N. J. This new unit uses a double boiler heating principle stated to provide uniform thermostatically controlled indirect heating. The unit has no engines, pumps or other similar mechanical equipment. Through an ingenious grouping of patented engineering and heating methods, the new model is claimed



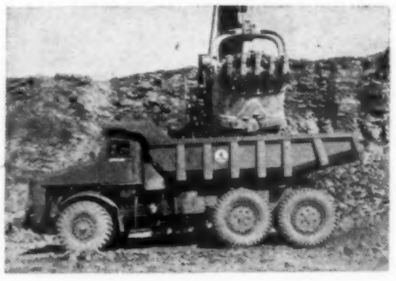
Model No. 120 DVP Double Vat Kettle

to not only bring uniform heat to the compound from the sides and bottom of the kettle, but also from within the melting compound itself. To keep this uniform heat at the exact temperature required by the particular compound being used, a new type of valve, designed during the war for use on big Army bombers, has been adapted to permit the use of thermostatic controls on this kettle. Once having lit the burners on the kettle, the operator then need only turn a knob dial to the exact temperature required and the burners automatically go on and off as heat may be needed to keep the melted material at the exact heat necessary for best operation.

20

New 40-Ton Truck

A 40-ton capacity rear-dump truck was recently completed in the experimental department of the Euclid Road Machinery Co., Cleveland, O. It is powered by a 12-cylinder supercharged Cummins Diesel engine of 550 hp. Front tires are 18:00 x 24 size; the eight tires on the two drive axles are 16:00 x 32 —manufactured by Goodyear Tire and Rubber Co., they measure 5 ft. 6 in. in diameter. Gross weight of the truck with capacity payload is approximately 80 tons. Still in the experimental classification, this truck has been shipped



Experimental 40-Ton Capacity Rear Dump Euclid Truck

to a mining property of M. A. Hanna Co. on the Mesabi Iron Range in Minnesota where its performance is being tested and observed by Euclid engineers. Future production plans will be developed after extensive field test.

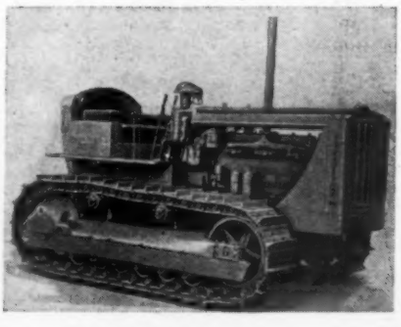
New "Caterpillar" Equipment

Six new products have been announced by Caterpillar Tractor Co., Peoria, Ill.: Diesel No. D 12 and Diesel No. D 112 motor graders; Diesel D 4 and D 6 track-type tractors and Diesel D 315 and D 318 engines.

21

Tractors

The D 4 tractor developes 43 drawbar horsepower and the D 6 65 hp. The D 4 has a maximum drawbar pull ranging from 9,980 lb. in first to 2,950 lb. in fifth. It has five forward speeds ranging from 1.7 m.p.h. in first to 5.4 m.p.h. in fifth. The reverse speed is 1.9 m.p.h. The engine is a 4-cycle water cooled 4-cylinder Diesel. The weight (shipping) is 10,430 lb. for the 60 in. gauge and 10,195 for the 44 in. gauge. The D 6



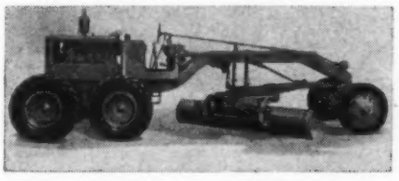
Diesel D 6 Tractor

tractor has a maximum drawbar pull of 16,350 lb. in first and 3,490 lb. in fifth. It has five forward speeds ranging from 1.4 m.p.h. in first to 5.8 miles in reverse. It has four reserve speeds ranging from 1.8 m.p.h. to 5.4. The engine is a 4-cycle water cooled 6-cylinder Diesel. The shipping weight is 17,330 for the 74 in. gauge and 16,695 lb. for the 60 in. gauge.

22

Motor Graders

The No. 12 grader has a 100 hp. engine. It has a weight (shipping) of 22,200 lb. Its length over-all is 25 ft., 2 in. and its blade is 12 ft. by 24 in. by ⅝ in. Its speed in 1st gear is 2.3 miles per hour and in 6th gear 19.3 miles. The No. 112 grader has



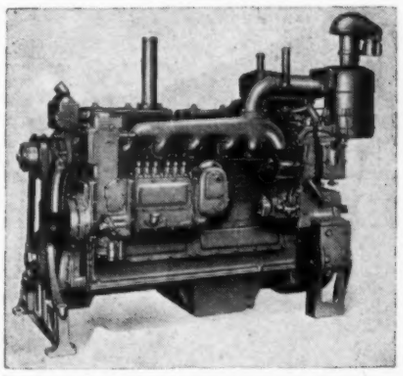
Diesel No. 112 Motor Grader

a 70 hp. engine. It has a weight (shipping) of 19,170 lb. Its length over-all is 24 ft., 11 in. and its blade is 12 ft. by 24 in. by ¾ in. Its speed in 1st gear is 2.1 miles per hour and in 6th gear 16 miles. Keynoting the improvements in the motor graders is the 100% constant-mesh transmission, with helical gears, which eliminates the necessity of stopping the machine to change speeds. Six forward speeds are provided in each of the new motor graders. Power operated mechanical controls are equipped with effective brakes which prevent creeping or coasting under load. Arched front axles offer maximum clearance. The new Diesel No. 12 is equipped with electric starting for the gasoline starting engine as standard equipment while such a feature may be used on the Diesel No. 112, where desired.

23

Diesel Engine

The D 315 engine has 4 cylinders, a 4½ in. bore, 5½ in. stroke, and 350 cu. in. displacement. The D 318 has 6 cylinders, 4½ in. bore, 5½ in. stroke, and 525 cu. in. displacement. Refinements of these new engines, as outlined by the manufacturer, include: One-quarter inch increase in bore. A heavier, stronger crankshaft, with 36% larger journals (cross sectional area) and 30% larger crank pin bearings. Individual inlet and outlet manifolds positioned on opposite sides of the cylinder head. Larger valves and high valve lifts. Oil cooled, strut



6-Cylinder 104 HP D 318 Engine

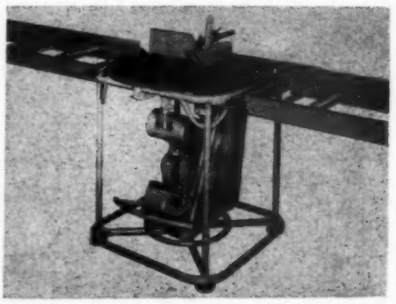
type pistons of composite construction. New oil pressure control systems. New fuel injection valve design. New solid aluminum alloy main and connecting rod bearings. A new governor, equipped with antifriction bearings throughout.

24

New Portable Power Saw

A new light weight gasoline-powered saw, brought out by Nordberg Manufacturing Co., Milwaukee, Wis., has the table, saw arbor and driving unit combined in a single rotating

unit. The rotating feature of the saw is stated to enable a lone operator to cut any miter without changing the position of the lumber, or shutting off the power. The desired cutting angle is obtained by merely rotating and locking the table in place for ripping, cross-cutting or



Nordberg-Buday Power Portable Saw

mitering. The lumber requires no rehandling for it is always kept lengthwise on the two 10 ft. long 18 in. wide roller work tables that are standard equipment. A convenient foot treadle provides most of the effort to move the 10 in. or 12 in. saw blade through the lumber. The saw has a cross-cut capacity of 4 in. x 4 in. or 3 in. x 12 in., and can rip 4 in. deep and 40 in. wide.

25

Wayne Crane Adds Hydraulic Steering

All Wayne crane units used as a shovel, trench hoe, dragline, clamshell or crane are now being shipped with hydraulic steering. The crane is a product of American Steel Dredge Co. Inc., Wayne Crane Division, Fort Wayne, Ind. The 5-way Wayne crane is built at Fort Wayne, with the hydraulic assembly equipped with a Vickers pump. A lever con-

Wayne Crane As a Trench Hoe

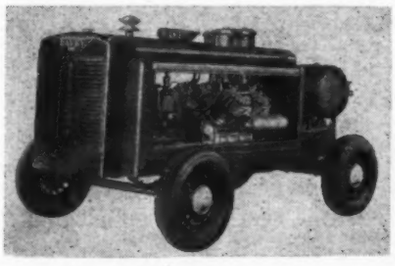
trol operates a 4-way valve which includes a built-in relief valve. The 4 gal. hydraulic fluid tank with the Vickers filter and pump has a capacity of 4 g.p.m. at 1,000 lb. with the relief valve set at 500 lb., and oper-

ates at a normal pressure of 250 lb. Pressure lines enter a rotating joint, pass through the vertical propel shaft and into a hydraulic ram with a 3½ in. diameter cylinder and a 6½ in. stroke. The hydraulic mechanism powers a heavy steering linkage and eliminates muscular effort in steering. The one-man machine travels, booms and hoists simultaneously or independently, and has 4-wheel drive equipped with dual wheels and tires for highway travel. Only two booms serve four ½ cu. yd. digging attachments and the 4-ton crane.

26

New Air Compressor

A new V-type 160 cu. ft. portable air compressor is now under production by Davey Compressor Co., Kent, O. Known as the Model 160 Air Chief, the new unit is available in standard skid, steel wheel trailer and pneumatic tired trailer mounting styles. On trailers spring mounting is included without extra cost. Flanged wheel type units are also manufactured for railroad work. The compressor unit is of double V-type design, with three low pressure cylinders and one high pressure cylinder. All cylinders have a 5-3/4 in. bore and 4 in. stroke. Over-all length of this unit built as a trailer is 127 in.; height is 70 in. and width is 72-3/4 in. The unit weighs 4640 lb. and has a turning radius of 35 ft. Standard gas units are equipped with Hercules JXD engines. The new model also includes the time-tested construction features which have always characterized the Davey line.

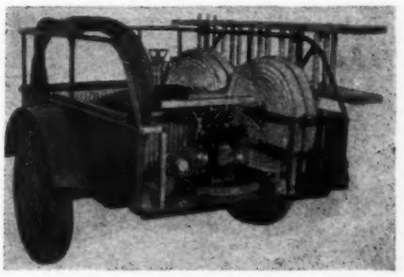


Model 160 Air Chief

27

Small Fire-Fighting Unit

A complete high pressure portable pumping and fire-fighting unit has been developed by Porto-Pump, Inc., Detroit, Mich. Compactly mounted on a 2-wheeled trailer, the unit consists basically of the Porto-Pump, a gasoline-driven high pressure utility pump; 75 ft. of supply hose and 250 ft. of fire hose; an 18 ft. 3 section extension ladder; fire axe and hand type extinguisher. The pump is independently powered, capable of delivering over 40 U. S. gals. of water per minute at 120 lbs. pressure. A dependable 4-cycle, 5 H. P. gasoline engine is mounted integrally with the pump.



Porto-Pumper

28

New Oil Pressure Safety Device

A new safety device, called Oiltrol, designed to prevent pressure lubrication failures, has been placed on the market by Oiltrol Co., Denver, Colo. Installed in the lubrication system, any drop in oil pressure below predetermined safe operating levels will activate the Oiltrol unit and energize danger signals or emergency

controls of any desired type. Lubrication pressure failures are detected before bearings freeze and extensive damage has occurred. Wherever gasoline engine powered installations are involved, Oiltrol protection is stated to be particularly effective. An oil pressure drop will cause the unit to break the ignition circuit and the

Oiltrol Oil Pressure Safety Device

gasoline engine will stop immediately. Sturdily constructed of extruded aluminum, Oiltrol is simply and compactly designed for easy installation and universal adaptability. No alteration in any existing lubrication system beyond the addition of a spur oil line to carry oil pressure to the Oiltrol switch is necessary to install this new device

MANUFACTURERS' LITERATURE

29

Brooks Load Lugger

Seven tilt-type containers for the Brooks Load Lugger are illustrated in a bulletin of Brooks Equipment & Mfg. Co., Knoxville, Tenn. Specifications for the various models and for buckets are included. Also illustrated and described in the bulletin is the truckrane, a boom attachment that is stated to double the utility value of the Load Lugger.

30

Air Compressors

Capacities, ratings and specifications for Air King Compressors (1-15 hp.) are given in a bulletin of Worthington Pump and Machinery Corporation, Harrison, N. J. Weights and dimensions for single stage and two-stage base compressor, base mounted compressor and tank-mounted compressor also are included.

31

Heavy Duty Trucks

The 10 and 12 ton FWD trucks, built for heavy duty service, are described in a circular published by The Four Wheel Drive Auto Co., Clintonville, Wis. Various features, including the 150 to 200 hp. gasoline or Diesel engines, are illustrated and described.

32

Wagon Drills and Drifters

Blue Brute UMW-40 wagon drills and WD—40D drifters are featured in a bulletin of Worthington Pump & Machinery Corporation, Harrison, N. J. The versatility of the units in operating positions is shown in illustrations. Features of the units are illustrated and described. Specifications also are included.

33

Tractors

A 24-page catalog issued by International Harvester Co., Chicago, Ill., lists many of the applications for which International industrial tractors are used and illustrates some

of the matched equipment available with them. Three models of heavy-duty tractors powered by gasoline engines which can be equipped to burn kerosene or distillate are completely described and illustrated. All specifications are given. Two models of Diesel-powered heavy-duty tractors are similarly described and illustrated with all specifications given. A light tractor powered by a gasoline engine for highway mowing and similar applications is also illustrated and described. The salient features of International Diesel engines and gasoline engines that power these tractors are explained in text and pictures.

34

Front End Loader

A new combination loader, dozer and snow plow is described in a circular issued by Henry Manufacturing Co., Salina, Kan. The unit consists of a frame assembly which can be easily attached to, or detached from, any of the various makes and models of track type tractors ranging in size from 20 to 60 hp. No special built tractor is needed.

35

Tournapull Application

A new Tournapull booklet issued by R. G. LeTourneau, Inc., Peoria, Ill., is devoted mainly to captioned action photographs taken on typical Tournapull jobs in the general construction, industrial, railroad, mining, pit and quarry, and export fields. Actual job histories show how Tournapulls are being successfully used on roadwork, dams, airports, levees, plant site grading, coal handling, stripping and working gravel pits, and lime reclamation.

36

Tire Valve Converting

With the development of the new wide base rim and "W" tube for trucks and buses, the tire valve converting and replacement practice has changed accordingly. To keep up with the latest changes and to aid in training new personnel in tube repair shops, etc., A. Schrader's Son, Brooklyn, N. Y., has prepared a new tire valve converting manual. It tells which valve to use for a specific rim and tube combination and it shows how to make the correct first and second bends in the valve to fit the old and new rim designs.

37

Refills for Oil Filters

Briggs standard refills for its oil filtration equipment are illustrated and described in a booklet issued by The Briggs Filtration Co., Bethesda, Md. How to change refills is described and useful service instructions on the filtration or lubricating oils are given.

38

Hoist for Bridge Repairs

An illustrated bulletin giving detailed information on a method of straightening steel bridges is published by Coffing Hoist Company, 800 Walters Street, Danville, Illinois. Called Bulletin B-18, it also lists complete information on the company's entire line of Coffing Safety-Pull Ratchet Lever Hoists. Write direct to manufacturer, or check above number on inserted card and mail.

39

Pneumatic Tired Roller

The "Cemco" flat-iron pneumatic tired road roller, stated to be new in principle, construction and operation, is described in a circular issued by Construction Equipment & Manufacturing Co., St. Paul, Minn. This roller was designed by a paving contractor, to smooth as well as compact stabilized bases, bituminous cold lay wearing surfaces and seal coat aggregates.

40

Aerial Surveys

A publication describing how large areas of ground can be surveyed from the air and topographic maps made

to 2 ft., 5 ft., 10 ft. or 20 ft. contours from aerial photographs at a considerable saving over the cost of conventional ground surveys has been issued by the Aero Service Corporation, Philadelphia, Pa. The publication is a symposium of articles by well known highway officials describing how this type of contour map developed from aerial survey photographs has been used with great economy of money and time in determining the most feasible location for highways.

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Notes on Shoulder Maintenance

(*Continued from page 60*)

shoulders that are too low. A drop off and generally low condition develops along intensively traveled pavements, due to frequent edging over of dual-tired vehicles. The trouble begins with the inevitable small rut immediately along the slab edge.

The cure for this, also completely mechanized, is to come along with a dump truck loaded with granular materials and tail-gate a thin layer of fresh material, which is spread as the truck travels by means of a low-type drag. The trick is to dump at just the right rate to keep the drag full. Immediately following the drag comes a roller (5 to 7 tons) which makes one or two passes to consolidate the material.

Several types of drags are commonly employed. One is the type WS drag, which is a long drag with several alternating diagonal blades. Another type is a "bull drag", which has a width of 3½ ft. and is weighted down by one man riding. As a final clean-up operation a grader blade is brought along to clean loose material off the pavement.

Berm maintenance is usually done with special crews, each completely mechanized, and each consisting of only three or four men beside the operators. Specifically, a crew will consist of a power grader operator, loader operator, about 5 truck drivers, 2 men for flagging and doing hand cleaning around small bridges, and a foreman.

Stone Stabilization; Widening

For heaviest traffic routes the shoulder surfaces are stabilized periodically by adding 1-in.—minus stone chips. While on the subject of shoulders, an interesting circumstance has been noted in connection with concrete pavements that have been widened one or two feet on either side with a strip of bituminous materials. The driver's eye picks up this strip because of its contrast in color, and he seldom goes over the edge. Grass grows right to the edge, whereas a widened pavement of the same width which is all of one surface type will have a two-foot bare shoulder strip along either side from tire encroachment.

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Letters and Comments

(*Continued from page 90*)

reference to the inlets.

A question which ought to be raised is the effect of trash on the operation of the cast-iron inlet throats. It appears possible that pieces of paper and twigs could easily lodge at the entrance to the 8-inch pipe cutting off flow almost completely. This question could be answered in part at least by introducing various kinds of trash into the gutter flow in full-scale tests with the cast-iron inlets in place. In this connection the pair of inlets is probably superior to a single inlet in that the first inlet will probably catch nearly all the trash which washes off

the roadway at the beginning of the storm and the second inlet will be left comparatively free to carry the cleaner flow which follows.

Comments received on foregoing discussion from the author, E. C. Woodward, Texas highway department, Fort Worth.

We have read with interest Mr. Izzard's discussion and think he has handled the matter beautifully with the application of hydraulic formulae.

In regard to the trash stopping up the inlet units, we do not consider this a serious matter for the reason that we believe the pavement and gutter will be kept fairly clean of trash by motor traffic blowing it on over the low rolled curb to the shoulder and of course we also expect the maintenance crew to keep the expressway fairly clean. There is no doubt that certain kinds of trash would at least partially stop one of the openings if allowed to accumulate in the gutters.

WITH THE MANUFACTURERS & DISTRIBUTORS

Link-Belt Speeder Transfers Headquarters

Announcement has been made by the Link-Belt Speeder Corporation of the transfer on March 17th, of the general sales, credit and accounting departments from Chicago to 1201 Sixth St. S.W., Cedar Rapids, Ia. Communications and telephone calls pertaining to repair parts for the series "300" and "500" machines, only, will continue to be handled at the Chicago Office, at 301 W. Pershing Road, Chicago 9, Ill.

SKF Charts Expansion

Plans for expansion of plant facilities to meet increased postwar demands for spherical roller bearings have been announced by SKF Industries, Inc. Production of this type of bearing will be increased eventually by approximately 50% as new facilities become available in the next year. As part of the expansion, the cast iron department, which produces anti-friction bearing pillow blocks, will be moved gradually to Hornell, N. Y., and the cage stamping department to Shippensburg, Pa. Occupancy of these plants is expected to begin about July 1.

Vogel Joins Teco

Frederick H. Vogel, wood technologist of wide experience, has joined the laboratory staff of the Timber Engineering Co., Washington, D. C.

New B-G Distributor

State Equipment Co., with headquarters at Harrisburg and a branch office at Wilkes-Barre, Pa., has been appointed by Barber-Greene Co., Aurora, Ill., as exclusive distributor, representing Barber-Greene Construction and Industrial Divisions in the following Pennsylvania counties: Union, Montour, Northumberland, Snyder, Juniata, Dauphin, Perry, Cumberland, Lebanon, Franklin, Adams and York. The appointment provides complete facilities for sales, service and repairs at the company headquarters at Harrisburg, under the direction of Paul Newton, General Manager.

Appointed Parts Depot Manager

J. W. Cooper, formerly manager of International Harvester's Harrisburg general line branch, has been appointed manager of the company's new parts depot at Baltimore, which will open in July. This parts depot, one of several to be opened by Harvester, will serve 33 branches and more than 1,000 dealers in nine eastern seaboard states.

Robins Moves Birmingham Office

Effective Feb. 10, 1947, the Birmingham office of the Robins Conveyors Division was consolidated with that of the Hewitt Rubber Division, both of Hewitt-Robins Inc. Since that date, the Birmingham office which was formerly in the Brown-Marx Bldg., has been located at: 615 North 9th St., Birmingham 4, Ala.

Viles Opens New Office

Fred M. Viles & Co. Inc., Spokane, Wash., distributors, has opened an office at Lewistown, Idaho, which will be in charge of Dan Madden and Dan O'Leary. The company will now service the following counties: Idaho, Latah, Clearwater, Nez Perce, and Lewis in Idaho; Asotin, Columbia, Walla Walla in Washington; Union and Wallowa in Oregon. In a portion of this territory, they do not handle AC but they do handle construction equipment as covered by their sales and service force.

Mack Appoints Rowold

Henry Rowold has been appointed assistant general sales manager of Mack-International Motor Truck Corporation, New York, N. Y. Mr. Rowold, also a vice president of the company, combines his new duties with those of National Accounts Manager, a position he has held for some time.

CLEARING HOUSE

HELP WANTED

Road and Bridge Superintendent

wanted by New England General Contractor. Give age, experience and references first letter.

Box 107, Roads & Streets,
22 W. Maple St., Chicago 10, Ill.

Asphalt Surface Foreman Wanted

One who has had experience in the laying of Hot Plant Mix Asphalt Surfacing with Machine Spreading, and also Hand Raking. Must be qualified and deliver excellent surface job. Will pay large salary to right party. Furnish references, and state salary expected. Location of Operations — Great Lakes Region.

Box 108, Roads & Streets, 22 W. Maple St., Chicago 10, Ill.

FOR SALE

TANKS — PILING, ETC.

25—10,000 gal. Car Tanks with Coils.
75—4200 gal. cap. Vert. Steel Tanks.
200 Tons Carnegie 27-lb., 40-ft. Piling.
2—1,000 ft. Chg. Pneu. Diesel Compressors.

R. C. STANHOPE, INC.
60 East 42nd Street New York 17, N. Y.

FOR SALE

TRANSITS and LEVELS

New or Rebuilt

Sale or Rent

Headquarters for REPAIRS—any make. Factory service. We will also *buy* your old instruments or take them in *trade*.

A complete line of engineering Instruments and Equipment for Field or Office. Write for Bulletin RS-114.

WARREN-KNIGHT CO.

Manufacturers of Sterling Transits and Levels
136 N. 12th St. Philadelphia 7, Penna.

For Sale or Rent

3 Terra Cobras purchased late 1946, in practically new condition. Also for sale, 5 Model LP LeTourneau scrapers with power control units, excellent condition.

Arcole Midwest Corporation
221 N. La Salle St., Chicago 1, Ill.

In
CLEVELAND
IT'S THE
HOLLENDEN

1000 ROOMS WITH BATH
RADIO IN EVERY ROOM
SIX FINE RESTAURANTS
CENTRAL DOWNTOWN LOCATION
GARAGE ATTACHED

JAMES J. FITZPATRICK
GENERAL MANAGER

FOR SALE

FOR SALE

2—White Diesel Tandem Trucks —powered by Cummins Model HB600 Engine, 200 H. P.

IMMEDIATE DELIVERY.

JOHN FABICK TRACTOR CO.
3100 Gravois Ave. St. Louis, Mo.

1—HD7-Allis Chalmers Tractor with Baker Bulldozer—thoroughly rebuilt.

1—Allis Chalmers #54 Speed Patrol Power Grader in good condition. Price $7,500.00 for both machines.

Charter Oak Construction Co., Inc.
525 Main St. Hartford 3, Conn.

FOR SALE

1—Foote Paver $3,000.00
1—Huber Roller, Gas, 10-ton —3-wheel 1,250.00
3—Steam Tandem Rollers (Prices vary)
2—Drott Universal Bull Clam Shovels (New), each 900.00
1—Buckeye Sub Grader, 10' to 12' 3,250.00
1—Iroquois Asphalt Plant 2,000 lb. box 15,000.00

PHIL H. McQUIRE
P. O. Box 34, Norfolk, Va.

TRENCHER
PARSONS Model #310
Serial #1485 Caterpillar Diesel Model D-8800 36" Buckets, Side Cutters to 42". 4' conveyor extension.

In good shape, ready to work.

D. C. ELPHINSTONE, INC.
115 S. Calvert St., Baltimore 2, Md.

Inquiry Blank and Advertisers' Index

Check reference to advertisement or to items of equipment or materials on which you wish to receive information. Give your name and address in the space at foot of page (if convenient, please print or use typewriter), detach page and mail to ROADS AND STREETS, Readers' Service Department, 22 West Maple Street, Chicago 10, Ill. We will pass your inquiry along to manufacturers and see that you get desired information promptly.

Check below advertisements on which you wish information on products featured:

*Advertisers with * are represented in the 1946 edition of Powers Road and Street Catalog and Data Book. Please refer to it for additional information on any of their products.

Check other products below on which you wish us to obtain information for you:

AGGREGATE:
- ☐ Bins and Hoppers
- ☐ Conveyors
- ☐ Crushers
- ☐ Portable Plants
- ☐ Screens

BITUMINOUS:
- ☐ Batchers
- ☐ Finishers
- ☐ Distributors
- ☐ Dryers
- ☐ Heaters
- ☐ Plants (central)
- ☐ Plants (travel)

CONCRETE:
- ☐ Batchers
- ☐ Buggies and Carts
- ☐ Finishers
- ☐ Joints, Expansion and Contraction
- ☐ Reinforcement Accessories
- ☐ Metal Road Accessories
- ☐ Mixers (under 1 yd.)
- ☐ Mixers (1 yd. up)
- ☐ Pavers
- ☐ Reinforcing Steel
- ☐ Road Forms (1000' set)
- ☐ Tower
- ☐ Truck Mixers

CRANES:
- ☐ Crawler Mounted
- ☐ Truck Mounted
- ☐ Piledrivers

GRADERS:
- ☐ Blade, self propelled
- ☐ Blade, pull type
- ☐ Blade, under truck
- ☐ Elevating

LOADERS & TRENCHERS:
- ☐ Front-end loader (tractor mounted)
- ☐ Loader, bucket type and belt type
- ☐ Trencher or Ditcher

HAULING EQUIPMENT:
- ☐ Dump Trucks, self-powered
- ☐ Dump Wagons, tractor drawn
- ☐ Flatbed Trailers
- ☐ Other Trucks

PUMPS:
- ☐ Centrifugal
- ☐ Concrete
- ☐ Diaphragm
- ☐ Mud Jacking
- ☐ Piston
- ☐ Wellpoint

POWER UNIT: (Independent)
- ☐ Gasoline
- ☐ Diesel
- ☐ Electric

ROLLERS:
- ☐ Power (Smooth)
- ☐ Pneumatic Tire
- ☐ Sheepsfoot

TRACTORS:
- ☐ Crawler
- ☐ Rubber-Tired

TRACTOR EQUIPMENT:
- ☐ Dozers
- ☐ Power Control Units
- ☐ Rippers
- ☐ Scrapers, tractor drawn
- ☐ Scrapers, self-powered

BUCKETS:
- ☐ Clamshell
- ☐ Concrete
- ☐ Dragline
- ☐ Orange Peel

SHOVELS & DRAGLINES:
- ☐ Crawler (under 1 yd.)
- ☐ Crawler (1 yd. up)
- ☐ Truck Mounted

ROCK DRILLS & AIR TOOLS:
- ☐ Air Compressors
- ☐ Backfill Tampers
- ☐ Clay Diggers
- ☐ Concrete Vibrators
- ☐ Drills, cabel tool
- ☐ Drills, tripod and wagon
- ☐ Drills, rock, hand-held
- ☐ Paint Sprayers
- ☐ Paving Breakers
- ☐ Riveters and Chippers

MISCELLANEOUS:
- ☐ Buildings, portable
- ☐ Earth Drills, power
- ☐ Light Plants
- ☐ Lubrication, Service Truck
- ☐ Mowers, Highway
- ☐ Power Saws
- ☐ Soil Stabilizing Equipment
- ☐ Snowplows, rotary
- ☐ Snowplows, v or wing
- ☐ Spreaders, sand or cinders
- ☐ Street Flushers
- ☐ Street Sweepers
- ☐ Welders
- ☐ Cutting Torches
- ☐ Hydraulic Jacks
- ☐ Hydraulic Control Equipment
- ☐ Hand Tools
- ☐ Hoists, derrick type

Be sure to fill in name and address below:

Your Name.....Title or profession.....

Name of your company or governmental department.....

Type of work for which equipment will be used.....

Street Address.....

City ..... State ..... County .....

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Contractors everywhere are more and more relying on Hazard LAY-SET Preformed Wire Rope. They know LAY-SET is the long-lasting, easy-to-handle wire rope that reduces the frequency of machinery shutdowns for rope replacement. Their machines move more dirt, lift more material, when equipped with LAY-SET. It is particularly well-adapted to bulldozers, scrapers, shovels, draglines or any other job that is really tough. Hazard LAY-SET Preformed can boost your production record.

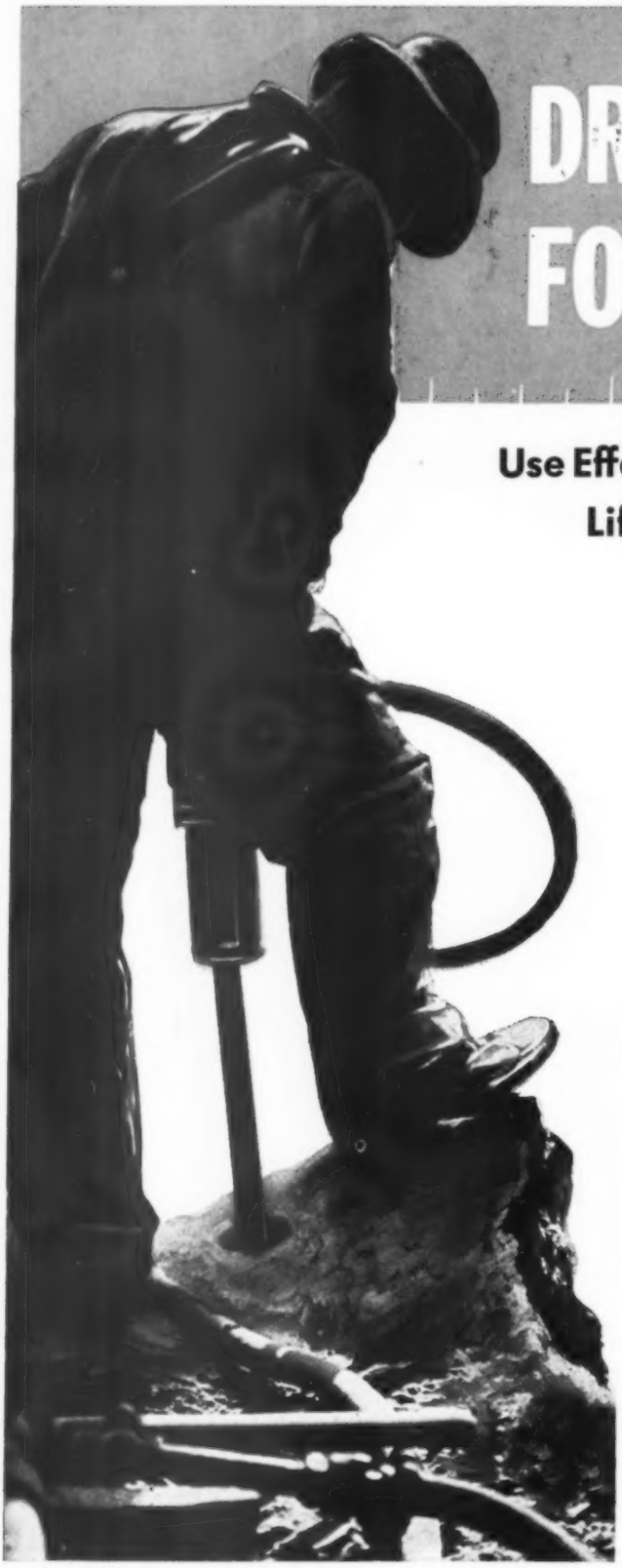
ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety



DRILL GREATER FOOTAGE at Lower Cost

Use Effective Lubrication to Increase Drill Life and Reduce Maintenance Cost

You can't buy more effective lubrication than Texaco Rock Drill Lubricants (E.P.) — and those letters "E.P." are an important reason why. They mean the oil has Extreme Pressure properties . . . extra high film strength to protect drills under the toughest conditions.

In addition, Texaco Rock Drill Lubricants (E.P.) flow readily at all temperatures, resist oxidation, cling protectively to moving parts and reduce wear. They prevent rust and corrosion whether drills are running or idle.

This all-around protection keeps drills running smoothly and on the job longer, with less downtime for repairs and overhauls. That's why operators and drill doctors everywhere prefer Texaco Rock Drill Lubricants (E.P.) and why leading rock drill manufacturers approve them.

Call on Texaco Lubrication Engineering Service for helpful suggestions on drill operation and maintenance. Contact the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

KEEP COMPRESSOR VALVES CLEAN

Here, too, effective lubrication is vital. *Texaco Alcaid, Algol and Ursa Oils* provide effective lubrication, prevent hard carbon formations, keep valves clean and active, rings free, ports open and air lines clear. Your Texaco Lubrication Engineer will recommend the right one to keep your compressors running right — efficiently and economically.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Tune in . . . TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.